FINAL REPORT

The Effects of the Medicare Catastrophic Coverage Act and Administrative Changes on Medicare SNF Participation and Utilization: 1987 - 1991

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EXECUTIVE SUMMARY

This study analyzes changes in the participation of nursing homes in Medicare's Skilled Nursing Facilities (SNFs) and changes in use of the SNF benefit between 1987 and 1991. The period of time covered coincided with major Medicare policy changes thought to affect the SNF benefit, such as the enactment and repeal of the 1988 Medicare Catastrophic Coverage Act (MCCA) and the issuance of clarified coverage guidelines. Partly as a result of the policy changes, Medicare SNF expenditures, which accounted for about 2 percent of total annual expenditures for nursing home care prior to 1987, increased to almost 4.5 percent by 1991.

The aim of this study is to provide a better understanding of changes in participation and utilization between 1987 and 1991 that were associated with characteristics of nursing homes, Medicaid policies related to nursing homes and area characteristics. Because of the strong incentives for increased provision of Medicare SNF services embodied in the MCCA provisions, we examined changes between 1987 and 1989 to detect different responses to the implementation of the MCCA provisions and coverage guidelines. We also studied changes between 1989 and 1991 to assess the extent to which nursing homes might have had different responses to the repeal of the MCCA provisions.

We analyzed changes in facility certification from non-Medicare SNF or intermediate care facility (ICF) to Medicare SNFs and changes in Medicare-certified beds, to determine how nursing homes increased or decreased their capacity to provide Medicare SNF services. We looked at changes in Medicare covered days per bed, Medicare admissions per bed, length of stay, and Medicare casemix, to determine how facilities that were Medicare-certified varied in their provision of SNF services and in the casemix severity of their Medicare patients.

Data

We used data from multiple sources including the Medicare and Medicaid Automated Certification System (MMACS) and the Medicare Provider Analysis and Review (MEDPAR) SNF files. Of particular interest to this study were: the conversion of Medicaid SNFs and ICFs to Medicare SNF status and the growth in the number of Medicare-certified beds among both new Medicare SNFs and nursing homes that were already Medicare-certified in 1987. The MEDPAR SNF data provided information on changes in Medicare SNF days and casemix. With the combined MMACS and MEDPAR data, we analyzed changes in utilization to determine associations with new versus existing Medicare bed capacity. We relied on other services of data in multivariate analyses to examine differential changes in participation and utilization associated with Medicaid nursing home policies. These data include reimbursement rates and area characteristics such as hospital discharges per Medicare enrollee.

Findings

- Results from our analysis were consistent with national program statistics indicating *large increases in the utilization of Medicare SNF days between 1987 and 1989, and a decline in covered days between 1989 and 1991. The magnitude of the change between 1987 and 1989 strongly suggests that the MCCA, along with the clarification of coverage guidelines, had an impact on the SNF benefit during this period.* Although we could not estimate the precise effect of each policy, we think that the multiple provisions of the MCCA were responsible for a major share of the growth in utilization between 1987 and 1989. The decline in Medicare SNF days between 1989 and 1991, reflecting the repeal of the MCCA SNF provisions, supports the effect of the MCCA on Medicare SNF use in 1989. The fact that utilization did not return to pre-MCCA levels suggests, however, that along with the maturation of response to the coverage guideline clarification, other factors were contributing to the growth of the Medicare SNF benefit. We think that OBRA 1987 requirements and a shift in orientation of many nursing homes toward the provision of rehabilitation services and other subacute care services contributed to the facility participation and beneficiary utilization trends that occurred after the repeal of the MCCA.

- Through multivariate analyses we found *differential responses in the provision of SNF services by provider characteristics. For example, proprietary nursing homes were more responsive than government homes to the MCCA and coverage guidelines.* Between 1987 and 1989, proprietary homes, both SNFs and ICFs, that were not certified in 1987 to provide Medicare SNF services were more likely than government owned homes to become Medicare-certified by 1989. In addition, *proprietary homes had greater growth in Medicare SNF utilization than government homes between 1987 and 1989 and a smaller decline between 1989 and 1991.* Similarly, freestanding SNFs had greater increases in covered days per bed, admissions per bed, and length of stay between 1987 and 1989 than did hospital-based SNFs. Some of the differences in growth were probably attributable to the transfer of Medicaid residents of freestanding SNFs to Medicare payment status. Such transfers were much less likely to occur among hospital-based facilities because in general they do not provide long-term nursing care. With the repeal of the MCCA provisions, Medicare SNF use declined more among freestanding SNFs than among hospital-based SNFs.

- One of the Medicaid nursing home policy variables in our multivariate analyses was the average Medicaid reimbursement rate for SNFs. *Empirical results indicate that the relationship between Medicaid SNF rate and Medicare SNF provision was negative in the 1987-1989 period.* For example, in that period, the higher the Medicaid SNF payment rate, the less likely that non-Medicare participating SNFs or ICFs would become certified for Medicare. Likewise, where Medicaid SNF rates were higher, growth in Medicare utilization was lower. One reason for these findings may be that where Medicaid payment rates are higher, nursing homes prefer to serve Medicaid patients rather than Medicare patients.

- We also found that *nursing homes in states that employed a casemix adjustment in setting their Medicaid nursing home payment were generally more likely than homes in other states to begin participating in Medicare and to have had greater growth in Medicare utilization.* Casemix adjustment was positively associated with the likelihood of non-Medicare SNFs converting to Medicare status and increases in Medicare beds between 1987 and 1989. Greater growth in Medicare-covered days per bed was found among nursing homes in casemix states for both the 1987-1989 and the 1989-1991 periods.

- Our analysis points to *increased access to Medicare SNF care.* Medicare-certified service provision expanded greatly even with the repeal of the MCCA, and more nursing beds became certified for Medicare over the study period. Expansions in access are a likely consequence of several factors. First, the coverage clarifications may have served to make nursing homes more willing to serve Medicare patients because of greater certainty regarding Medicare coverage policy. Second, the MCCA may have given nursing homes greater familiarity with Medicare, making them more disposed to provide Medicare SNF services. Third, staffing data suggest that OBRA 1987 led to increases in staff levels, making it easier for more nursing homes to serve Medicare patients.

The 1987-1991 period covered by this study was an important juncture in the growth of the Medicare SNF benefit. Despite relatively high use of Medicare SNF services in the initial years of the Medicare program, administrative processes (e.g., coverage determinations) implemented by 1971 had greatly limited SNF use. For example, covered days per 1,000 enrollees were 878 in 1969, but only 361 in 1971. Low utilization rates persisted until 1989. With the maturation of the new coverage guidelines issued in 1988 and the implementation of the MCCA provisions, covered days per 1,000 rose to 865 in 1989, an amount comparable to that in 1969.

Although the implementation of the MCCA provisions was associated with a jump in covered days in 1989, repeal of the provisions resulted in a retrenchment in 1990, but to a level that did not reflect pre-MCCA levels. Recent program statistics indicate that, after the dip following repeal of MCCA, expenditures resumed their growth at a rapid rate with corresponding increases in covered days. Hence, although the MCCA SNF rules provided an impetus for the acceleration of Medicare SNF provision by many facilities, the backdrop for greater Medicare SNF use has also been provided by other policies. These policies include the 1988 coverage guidelines clarification, as well as a greater orientation among some nursing homes toward the provision of rehabilitation and other subacute care services. In conclusion, although the nursing home industry is still dominated by Medicaid, policy and industry changes have pushed Medicare more to the forefront of financing nursing home care.

I. INTRODUCTION

From 1971 to the late 1980s, Medicare Skilled Nursing Facility (SNF) services accounted for a small proportion (about 2 percent) of total nursing home expenditures. This is not surprising in light of the rules governing Medicare SNF services (Silverman, 1991). The extended care benefit provided by SNFs was designed to provide a cost-effective substitute for the final days of a hospital stay. Coverage under the benefit was limited to 100 days per stay, and was allowed only if it commenced within 30 days after discharge from a hospital.

Medicare SNF use was also constrained by the high copayment amount, which was established at one-eighth the dollar amount of the Medicare hospital deductible (e.g., $81.50 for one average day in the hospital in 1992). The copayment was required for each day after day 21 of a SNF stay and, as the average daily charges for hospital care escalated, was often higher than the Medicaid or private rates for nursing home care. Eventually, beneficiaries did not find it in their interest to file claims past the 20 days fully covered.

Another limiting factor on use of Medicare SNF service was that guidelines on medical conditions that could be covered were very general and subject to widely varying interpretations by fiscal intermediaries such as Blue Cross/Blue Shield plans and commercial insurers. As a result, whether a prospective patient was covered under Medicare SNF services depended largely on the subjective judgment of a particular fiscal intermediary.

The inconsistency of Medicare fiscal intermediaries' determination of eligibility for individual patients also provided disincentives for extensive use of the SNF benefit. In light of the many constraints on the use of the SNF benefit, the average length of a Medicare SNF-covered stay was about 25 to 30 days and the rate of use of the benefit was about 10 per 1,000 enrollees per year.

In the 1980s, changes were made in Medicare policies that had the potential to increase the use of the SNF benefit. Implementation of a prospective payment system for hospital care in 1983 provided incentives for hospitals to discharge more patients to SNFs (Neu and Harrison, 1988). The Omnibus Budget Reconciliation Act of 1987 required that all intermediate care facilities (ICFs) meet the skilled staffing requirements of SNFs, thereby eliminating the distinction between the two levels of care. In effect, all Medicaid-certified nursing homes became skilled nursing facilities. The implication for Medicare was that more homes would be sufficiently staffed to also serve Medicare patients, thereby potentially improving access to the Medicare Extended Care benefit. Guidelines issued in 1988 clarified who could be covered by the SNF benefit and promised to reduce the uncertainties of intermediaries' determinations of coverage. The most significant changes were embodied in the SNF provisions of the 1988 Medicare Catastrophic Coverage Act (MCCA), which loosened many constraints on the use of the SNF benefit by eliminating the three-day prior hospitalization requirement and significantly reducing the copayment requirements.

In addition to changes in Medicare policies, changes in the health care industry in general suggested that nursing homes could experience major strategic changes in their roles relative to other health care providers. Increasing emphasis on rehabilitation care and other types of "subacute care" services appeared to be a new direction open to SNFs (Balsano and Fowler, 1993; American Health Care Association, 1994; Harris and Johnson, 1994). This shift has been fostered partly by the greater demand for such services by managed care organizations, and higher reimbursement for this type of care under Medicare relative to standard SNF care. In particular, rehabilitation services such as physical and occupational therapy are reimbursed as ancillary services that are "passed through" and not subject to reimbursement ceilings, as are routine nursing services. Thus, nursing homes receive payments equivalent to cost for ancillary services, as well as adjustments for administrative expenses. In addition, although the MCCA was repealed within one year, the incentives it provided for SNFs to focus on Medicare patients appear to have helped cause a structural shift in the nursing home industry toward patients who require heavier levels of nursing care.

This report presents findings on the longitudinal changes between 1987 and 1991 in Medicare- and Medicaid-certified nursing homes. The research reported here extends our prior research findings and constitutes part of a larger project to analyze trends in nursing home participation and utilization that were associated with the implementation of the MCCA SNF provisions in 1989 and other policies that affected the Medicare SNF program. This project has examined changes in Medicare SNF provision between 1987 and 1989 (Liu and Kenney, 1993), changes in certification status of Medicaid facilities between 1987 and 1989 (Liu, Taghavi, and Cornelius, 1993), and trends in Medicare-covered days, admissions, and length of stay (Marsteller and Liu, 1994). Prior research also included development of a MEDPAR-based casemix classification system and analysis of trends in casemix severity of Medicare SNF patients (Cornelius et al., 1995).

Report Outline

In this report we address the sources of growth in the use of the Medicare SNF benefit, by focusing on changes in Medicare certification, Medicare-certified beds, and Medicare beneficiary use per SNF bed. We also examine changes in the casemix of Medicare-certified facilities to determine if the level of severity among Medicare patients changed between 1987 and 1991. Finally, we analyze longitudinal data to assess the potential effects of the 1988 MCCA on the nursing home industry in general, as well as variations in responses to the MCCA across facilities.

The remainder of this report is organized as follows. In Section II we provide background on the Medicare Extended Care Benefit and the policy changes that have affected the benefit in recent years. In Section III we describe our analytic approach, data sources, and construction of analytic files. In Section IV we provide national-level descriptive statistics on changes in Medicare certification and SNF provision and other dimensions of nursing home use for the period studied. In Section V we present descriptive and multivariate analyses of changes in facility types, Medicare bed supply, stays per bed, and casemix between 1987 and 1991, using a panel of nursing homes with complete information for this period. In Section VI we summarize our study findings and discuss the implications of observed changes on access to the Medicare SNF benefit and on the characteristics of the nursing home industry in general.

II. BACKGROUND

Medicare Part A Extended Care Benefit

The Medicare Hospital Insurance (Part A) Extended Care Benefit covers short-term post-hospital care in nursing homes for persons needing inpatient skilled nursing or rehabilitative services. Coverage, up to 100 days of care per spell of illness, is limited to Medicare beneficiaries who had a hospital stay of at least three days within the prior 30 days. A spell of illness or benefit period ends when the beneficiary has not been an inpatient in a hospital or SNF for 60 consecutive days.

Coverage. The Medicare Extended Care Benefit was originally designed to provide a less costly alternative to inpatient hospital care for patients who require institutional skilled nursing care but not the scope and intensity of medical services provided in a hospital. Medicare SNF care is allowed under specific requirements regarding the level of skilled care necessary for Medicare coverage of SNF services. Hence, Medicare-covered SNF care differs from long-term nursing home care covered by Medicaid or private payment. In contrast to nursing home stays in general, which average more than one year, Medicare SNF stays have an average covered stay of 25 to 30 days.

Skilled nursing services and rehabilitative care meeting the Medicare coverage requirements include those needed on a daily basis and requiring the supervision of skilled nursing or rehabilitation professionals. Such a regimen can only be practically provided in a skilled nursing facility or on an inpatient basis. The types of services covered include skilled services that are essential to the rehabilitation and recovery of the patient and to prevent deterioration of the patient's conditions and sustain the patient's current capacity even when full recovery or medical improvement is not imminent. Also covered are persons who require skilled rehabilitation services that are essential to their recovery following a hospital stay or to prevent their condition from worsening (ProPAC, 1992).

Providers. Medicare SNF services are provided by skilled nursing facilities that are certified to participate under the program. A nursing home can be certified in whole or in part to provide care under Medicare and/or Medicaid. Of the 15,709 certified nursing homes in 1990, 8,514 were certified to serve both Medicare and Medicaid patients, and 788 were certified to serve only Medicare patients (Helbing and Cornelius, 1993). The remainder were certified to provide services only to Medicaid patients.

Medicare will also reimburse SNF services provided by rural hospitals with fewer than 99 beds under the national "swing-bed" program, authorized by the Omnibus Reconciliation Acts of 1980 and 1987. Congress enacted the option in order to encourage more efficient use of underutilized small rural hospitals. Medicare payments for swing-bed nursing care are made only when the services furnished to Medicare beneficiaries meet the same skilled nursing or rehabilitation care criteria required for SNFs (Helbing and Cornelius, 1993).

Although almost two thirds of Medicaid-certified nursing homes were certified to provide Medicare SNF services, these facilities make little use of the Medicare SNF benefit. Only a small percentage of nursing home expenditures are associated with the Medicare SNF benefit. Certification as a Medicare- or Medicaid-certified SNF generally does not mean that all Medicaid nursing homes have been oriented toward providing an intermediate level of nursing home care. Medicare and/or Medicaid SNF certified facilities often devote only a small portion of their total beds to skilled care.

Apart from the issue of quantity of Medicare-certified beds in nursing homes is the generally low levels of use of Medicare-certified beds by Medicare SNF patients. This is due to constraints on the scope and coverage of Medicare SNF benefits mentioned earlier, constraints that result in most expenditures coming from patients' pockets or from Medicaid. Most nursing home beds in certified facilities are used to provide care for Medicaid and private pay patients.

Beyond the small proportion of nursing home expenditure attributable to Medicare, the observation that most Medicare-certified SNFs serve few Medicare beneficiaries under the benefit is reflected in the distribution of Medicare SNF-covered days across facilities. For example, in 1987, 11 percent of the 8,000 Medicare-certified SNFs provided for almost half of all covered days, and less than 29 percent of facilities accounted for 74 percent of total covered days. At the other extreme, 9 percent of covered days in 1987 were spread across almost half of the certified facilities (Marsteller and Liu, 1994). Thus, the fact that many nursing homes are certified to provide Medicare SNF-level care does not imply that they in fact serve many Medicare SNF patients.

Reimbursement Policies. Medicare services in skilled nursing facilities are largely reimbursed on a retrospective, reasonable cost basis, subject to limits applied to routine operating costs (e.g., nursing, meals). Ancillary costs such as physical therapy, drugs, and capital are not included in the cost limits. For freestanding SNFs, the cost limits are set at 112 percent of the average costs of Medicare-certified portions of urban and rural facilities, respectively. For hospital-based SNFs, reimbursement limits are the corresponding levels for urban and rural freestanding facilities, plus 50 percent of the amount by which 112 percent of the hospital-based SNF costs exceed the limits for freestanding SNFs. Low-volume SNFs (i.e., those with fewer than 1,500 Medicare days of care annually) may elect to be paid prospectively 105 percent of mean operating and capital costs of all (both hospital-based and freestanding) facilities in their region. This prospective payment option for low-volume SNFs was implemented to lessen the administrative burden on low-utilization SNFs, with the goal of increasing access to SNF care for Medicare beneficiaries.

SNFs that do not elect the low-volume prospective payment are reimbursed for reasonable costs for routine services, based on the average total (Medicare and non-Medicare) cost of Medicare-certified bed days during the course of a reporting year. Hence, the average cost would usually reflect both the cost of all patients, Medicare and others, using those beds. Because Medicare SNF patients are post-hospital patients, they tend to require more routine care than other long-term care patients who might have used Medicare-certified beds. As a result, the average costs of Medicare-certified beds could sometimes understate the actual costs of caring for a Medicare SNF patient (Dor, 1989).

Although the difference in degree of illness and care between Medicare and non-Medicare patients using Medicare-certified beds provides a disincentive for some SNFs to serve Medicare patients, the means have not been available to adjust for patient severity (casemix) in the payment for Medicare SNF care. The reason why casemix adjustments for Medicare SNF services have not been developed is that data on patient characteristics, such as disability level, have not been routinely collected. Such characteristics have been found in prior research to be important predictors of per diem nursing home costs. In contrast, many states have been able to implement such casemix adjustments for the payment of nursing home care under Medicaid. Whether a state uses a casemix payment system may affect the extent to which nursing homes participate in the Medicare SNF program. Below we discuss areas where Medicaid nursing home policies, including casemix adjustments, may affect facility behavior toward Medicare Extended Care services.

Relationship to Medicaid and Other States' Nursing Home Policies

During the period covered by this study, 1987-1991, Medicare- or Medicaid-certified nursing homes provided skilled or intermediate levels of care; some facilities provided both levels of care. Virtually all Medicare-certified SNFs are also certified to provide Medicaid skilled nursing care. Because most patient days in Medicare-certified SNFs are paid by Medicaid, state policies governing the Medicaid nursing home programs can be expected to have an impact on a nursing home's behavior toward the Medicare SNF program. States' Medicaid nursing home policies, in terms of payment systems and control of bed supply, vary considerably (Buchanan, Madel, and Persons, 1991; Swan et al., 1993). In effect, "the Medicare SNF program exists in an environment where the state Medicaid programs dictate the characteristics of the nursing facilities" (ProPAC, 1992). As a result, whether a nursing home decides to have some or all of its beds certified to provide Medicare SNF care depends largely on how it responds to state Medicaid policies. Some nursing homes, for example, have focused almost exclusively on intermediate care patients;

although Medicaid reimbursement for this level of care is lower than for skilled care, the costs of caring for ICF-level patients are also lower.

Nursing homes have to decide the level of care they wish to focus on within the Medicaid program, and whether it is profitable to participate in the Medicare SNF program. The manner in which Medicaid reimburses facilities, and the expected payment amounts, will influence nursing home decisions about Medicaid participation and, consequently, about Medicare participation.

The effect of Medicaid payment policies on access for Medicare SNF patients is complicated, and multiple incentives exist that may operate in opposite directions (Scanlon, 1980; Bishop and Dubay, 1991). For example, nursing homes in states in which Medicaid payments are higher may be more likely to participate in the Medicare SNF program because of greater cash flow, capital acquisitions, and staffing capacity. On the other hand, with high Medicaid payment rates, the opportunity cost of serving a Medicare patient rather than a Medicaid patient also rises, making Medicare patients less attractive (see Table 2.1 for information on Medicaid payment rates by state).

Likewise, Medicare access may be either higher or lower in states that have casemix payment systems. This type of payment system theoretically provides incentives for nursing homes to admit higher cost patients because the amount of payment is related to patient need (Fries et al., 1994). Nursing homes in casemix payment states may be more likely to admit Medicare patients because their capacity for heavier care patients has been developed in response to the casemix-based Medicaid payments. On the other hand, Medicare patients, for whom the nursing homes are paid average costs, may not be as attractive as higher care Medicaid patients for whom nursing homes may be reimbursed at a level higher than average cost (Dor, 1989). Table 2.2 shows information extracted from a study by the University of California/San Francisco of which states used casemix adjustments in their nursing home payment system.

Table 2.1: Medicaid SNF and ICF Payment Rates, by State: 1987 and 1989

	1987		1989	
State	SNF	ICF	SNF	ICF
Alabama	$46.91	$31.98	$47.22	$33.54
Alaska	191.36	191.35	214.73	211.20
Arizona	--	--	--	--
Arkansa	31.29	31.99	34.88	33.28
California	48.90	38.62	60.26	44.22
Colorado	49.57	49.57	54.30	54.30
Connecticut	66.89	51.23	83.86	64.18
Delaware	50.35	50.35	65.21	65.21
District of Columbia	126.38	88.18	173.51	90.07
Florida	53.45	53.45	61.14	61.14
Georgia	39.48	36.35	46.81	42.95
Hawaii	84.84	72.51	93.74	81.29
Idaho	47.29	47.29	52.47	52.47
Illinois	43.29	35.21	49.69	39.73
Indiana	58.67	47.35	63.70	51.08
Iowa	115.32	32.17	117.16	36.89
Kansas	40.70	33.55	48.96	39.75
Kentucky	54.00	37.87	62.32	43.78
Louisiana	39.19	32.56	42.62	35.91
Maine	59.35	51.19	83.07	58.33
Maryland	54.05	54.05	61.23	61.23
Massachusetts	64.94	44.37	90.94	58.76
Michigan	45.69	45.69	50.78	50.78
Minnesota	62.28	46.29	68.31	50.90
Mississippi	41.47	33.63	45.59	36.64
Missouri	45.29	42.11	46.95	44.06
Montana	47.84	47.84	50.86	50.86
Nebraska	(55.66)	(34.48)	61.91	38.56
Nevada	71.87	55.82	91.06	61.71
New Hampshire	96.06	55.06	126.20	69.00
New Jersey	66.19	58.47	73.70	67.31
New Mexico	91.37	48.23	85.65	53.09
New York	96.80	63.83	112.93	72.83
North Carolina	54.93	41.69	61.40	46.33
North Dakota	51.78	39.45	53.62	40.99
Ohio	55.42	48.02	59.72	53.36
Oklahoma	40.00	30.50	54.00	37.00
Oregon	78.02	42.76	83.41	55.71
Pennsylvania	60.41	50.89	76.36	65.64
Rhode Island	57.59	53.02	75.11	65.00
South Carolina	41.75	41.75	47.50	44.64
South Dakota	40.38	31.23	44.36	35.24
Tennessee	56.39	35.81	66.88	38.83
Texas	45.48	33.28	49.16	36.36
Utah	50.76	40.57	52.60	43.65
Vermont	52.70	52.70	59.69	59.69
Virginia	65.55	47.23	70.59	51.78
Washington	48.06	47.01	58.84	57.46
West Virginia	51.18	46.56	57.11	52.78
Wisconsin	52.01	42.04	57.27	46.24
Wyoming	49.25	49.25	53.74	53.74
Mean	60.73	48.77	70.06	54.77

Source: Swan et al., 1993.

Table 2.2: States with Casemix Adjustments in Their Medicaid Payment Systems: 1987 and 1989

	1987	1989
Alabama	No	No
Alaska	No	No
Arizona	--	No
Arkansas	No	No
California	No	No
Colorado	No	No
Connecticut	No	No
Delaware	No	Yes
District of Columbia	No	No
Florida	No	No
Georgia	No	No
Hawaii	No	No
Idaho	No	No
Illinois	Yes	Yes
Indiana	No	No
Iowa	No	No
Kansas	No	No
Kentucky	No	No
Louisiana	No	No
Maine	No	No
Maryland	Yes	Yes
Massachusetts	No	No
Michigan	No	No
Minnesota	Yes	Yes
Mississippi	No	No
Missouri	Yes	Yes
Montana	Yes	Yes
Nebraska	Yes	Yes
Nevada	No	No
New Hampshire	No	No
New Jersey	No	No
New Mexico	No	No
New York	Yes	Yes
North Carolina	No	No
North Dakota	No	No
Ohio	Yes	Yes
Oklahoma	No	No
Oregon	No	No
Pennsylvania	No	No
Rhode Island	No	No
South Carolina	Yes	Yes
South Dakota	No	No
Tennessee	No	No
Texas	No	Yes
Utah	No	No
Vermont	No	No
Virginia	No	No
Washington	No	No
West Virginia	Yes	Yes
Wisconsin	No	No
Wyoming	No	No
Number of States with Casemix	11	13

Source: Swan et al., 1993.

At present, Medicare pays average costs for Medicare SNF patient care. Average costs vary across states and provider type because they reflect costs of both Medicare and non-Medicare patients in Medicare-certified units. Because Medicare usually represents a small percentage of patients in such units, it is the costs of Medicaid or private patients that determine the average costs for care. However, for routine nursing services, the reimbursement ceilings limit some of the variation in payment by truncating average costs at the high end of the distribution.

Other state policies that may affect the use of the Medicare SNF benefit are those governing the supply of nursing home beds. Certificate of Need (CON) was created by states in the mid-1960s to provide for the approval of health care facility capital projects. States have used CON to achieve a number of goals including the containment of Medicaid expenditures. CON use and effectiveness are a function of the specific components and goals of the program. Thirty-nine states have a CON program (Table 2.3), but no two are identical. For example, Nevada's program is relatively lenient: nursing homes only need state approval to add beds. In contrast, New York's program requires that any change in the number or type of beds, in capital expenditures, or in ownership undergo CON approval (ProPAC, 1992).

One study found that CON appears successful in constraining the growth and supply of nursing home beds, and that the longer a state's CON program was in existence, the greater the effect on limiting the supply of beds (Swan and Harrington, 1990). In general, states have been found to use CON programs, either alone or in conjunction with other factors such as state Medicaid reimbursement policies, to affect the supply of nursing home beds and Medicaid expenditures. Beyond CON programs, some states have simply implemented moratoria on bed growth.

In an environment where bed growth is constrained by CONs or moratoria, nursing homes face less competition from other providers, thereby allowing them greater latitude in the types of

Table 2.3: State Certificate of Need Programs

State	Certificate of Need
Alabama	Yes
Alaska	Yes
Arizona	No
Arkansa	Yes
California	No
Colorado	No
Connecticut	Yes
Delaware	Yes
District of Columbia	Yes
Florida	Yes
Georgia	Yes
Hawaii	Yes
Idaho	No
Illinois	Yes
Indiana	Yes
Iowa	Yes
Kansas	No
Kentucky	Yes
Louisiana	No[a]
Maine	Yes
Maryland	Yes
Massachusetts	Yes
Michigan	Yes
Minnesota	No
Mississippi	Yes[b]
Missouri	Yes
Montana	Yes
Nebraska	Yes
Nevada	Yes
New Hampshire	Yes
New Jersey	Yes
New Mexico	No
New York	Yes
North Carolina	Yes
North Dakota	Yes
Ohio	Yes
Oklahoma	Yes
Oregon	Yes
Pennsylvania	Yes
Rhode Island	Yes
South Carolina	Yes
South Dakota	No
Tennessee	Yes
Texas	Yes
Utah	No[c]
Vermont	Yes
Virginia	Yes
Washington	Yes
West Virginia	Yes
Wisconsin	Yes
Wyoming	No

SOURCE: ProPAC, 1992

[a] Approval process for Medicaid-certified beds estimates the need.

[b] There is a moratorium on construction of new beds.

[c] There is a moratorium on new Medicaid beds scheduled to expire in 1995.

patients they admit. Whether this situation favors participation in the Medicare SNF program probably is affected by the type of Medicaid payment system in states and the levels of Medicaid reimbursements. Because Medicaid rates may be higher where supply is constrained, Medicaid patients in states with CONs may be more attractive to nursing homes than Medicare patients. On the other hand, where bed supply is constrained, nursing homes may have sicker patients in general, and provision of care to Medicare SNF patients may not require major changes in the facility's staffing and other capacity.

In sum, a nursing home's response to policies affecting the Medicare SNF benefit will depend in large part on its state's Medicaid nursing home policies. The importance of Medicaid is that it accounts for about half of all revenues for most nursing homes, whereas Medicare has historically accounted, on average, for about 2 percent of nursing home revenues. Hence, nursing homes' participation in the Medicare SNF benefit can depend heavily on the incentives provided by Medicaid nursing home policies, in addition to the rules governing the Medicare SNF program.

Recent Policies Affecting Medicare SNF Services

In the late 1980s, several public policies and administrative guidelines were issued that had the potential to affect both providers of the Medicare SNF services and Medicare beneficiaries. These policies directly addressed nursing home participation in the Medicare and Medicaid programs, while other Medicare policies, such as the hospital prospective payment system, also had implications for the Medicare SNF benefit.

OBRA 1987. The Omnibus Budget Reconciliation Act of 1987 changed the Medicaid nursing home participation requirements by requiring that all ICFs match the staffing requirements of SNFs. As a result, the distinction between ICFs and SNFs was effectively eliminated under the Medicaid program. By 1990, all Medicaid-certified nursing homes were to be designated nursing facilities (NFs). OBRA 1987 also made the Medicaid nursing home requirements match those for Medicare SNFs, thereby eliminating the incentive for facilities not to have at least some units certified for Medicare. In effect, the same conditions for participation applied to both Medicare and Medicaid nursing home programs.

OBRA 1987 stipulated that all Medicaid nursing facilities had to meet a more stringent set of standards including (1) licensed nurses present 24 hours a day and a registered nurse (RN) on duty eight hours a days, seven days a week; (2) nurses' aides receiving at least 75 hours of state-approved training; (3) facility staff completion of a comprehensive needs assessment of each resident at admission, at least annually, and at any change in health status; and (4) state establishment of sanctions for facilities not meeting quality standards. Table 2.4 presents major differences between OBRA 1987 regulations and prior regulations.

The unification of Medicare and Medicaid nursing home standards eliminated barriers for previously Medicaid-only nursing homes to become Medicare providers as well, thereby providing incentives for increasing the supply of providers for the Medicare SNF benefit. The OBRA 1987 rules were required to be in effect by 1990.

Clarification of Coverage Guidelines. In April 1988, the Health Care Financing Administration clarified the coverage guidelines used by Medicare fiscal intermediaries to facilitate their determination of which patients qualified for benefits. The new guidelines were different than existing ones in that they provided clear examples of the services and situations in which coverage was appropriate, in contrast to examples that specified when services would not be covered. A major purpose of the clarification was to give participating nursing homes confidence that claims they submitted under the SNF benefit would not be arbitrarily denied. It was believed that in the

Table 2.4: Major Differences Between OBRA 1987 and Prior Regulations

Pre-OBRA 1987	Post-OBRA 1987
Separate regulations applied to SNFs and ICFs	The distinction between SNFs and ICFs was eliminated; all facilities are called nursing facilities with the same regulations.
No specific timeframes regarding completing plans of care were required. No quantifiable goals or objectives for care planning required.	A written plan of care is required which will provide services and activities that allow the resident to attain or maintain their highest level of functioning and well-being.
Patient assessments were not required, nor were requirements spelled out for the content of assessments if performed.	A comprehensive, accurate, standardized, reproducible assessment of each patient's functional capacity, coordinated by a registered nurse is required within four days of admission to the facility, and the resident must be reviewed at a minimum once every three months to assure continuing accuracy of the assessment.
Staffing requirements: SNFs-RN on duty at least 8 hours per day, seven days per week and LPN coverage 24 hours per day. ICFs-RN or LPN on duty 7 days per week during day shift available for prompt action in emergency situations 24 hours per day.	All facilities must have an RN on duty at least 8 hours per day, 7 days per week and an LPN on duty 24 hours per day, 7 days per week. States can waiver these stipulations if facilities can prove they are unable to recruit staff, that residents' health and safety is not endangered, and that an RN or physician is on call to the facility.
No requirements for certification, registry, or testing of nurse aides.	The employment of nurse aides who have not completed the required training and competency evaluation programs after four months of starting work is forbidden.
No requirement for a full-time social worker.	Facilities with more than 120 beds must employ a full-time social worker.
Resident's rights were included as a standard, under the Governing Body and Management condition.	Residents' rights have been spelled out, and have been elevated to Condition Level.
Utilization review was at a condition level, but emphasis was on appropriateness of utilization, not assessment of quality of care.	A quality assessment and assurance committee that develops and implements appropriate plans of action to correct identified quality deficiencies must be established. The data sets and instruments used to assess residents must be developed.
There was no preadmission screening requirement for persons with mental illness or mental retardation.	Each state must have a preadmission screening program for all persons with a primary or secondary diagnosis of mental illness or mental retardation (excluding a primary diagnosis of dementia). States must review all mentally ill or mentally retarded persons in nursing facilities to determine whether continued placement is appropriate and must arrange for discharge and active treatment of residents when continued admission is inappropriate.
Certification surveys were conducted annually, with no provision for flexible scheduling. Surveys were generally scheduled in advance.	Surveys can be scheduled up to 15 months after the prior survey, with some flexibility as to timing, although the statewide average for surveys must be every 12 months. Surveys are unannounced.
Enforcement options for facilities that violated certification requirements were limited to repeat offenders, i.e., facilities with deficiencies that went uncorrected from year to year. States had to close down facilities and/or transfer residents when facilities were found to place the health or safety of residents in jeopardy.	State enforcement powers were expanded. Intermediate sanctions, previously adopted by some states, are specifically authorized by federal law. Facilities that pose an immediate danger to residents can be placed under temporary management while improvements are made; civil penalties can be assessed, or the state can deny payments for new Medicaid admissions. States may establish programs that provide incentives for high quality care that can include public recognition or incentive payments or both. While final interim sanctions have not been published, any deficiency cold result in some type of sanction.

Source: Extracted from ProPAC (1992).

past, denial or the possibility of denial may have deterred Medicare SNF provision (Smits, Feder, and Scanlon, 1982; U.S. Department of Health and Human Services, 1985).

The 1988 Medicare Catastrophic Coverage Act. The MCCA of 1988 contained numerous provisions that had the potential to greatly increase the use of the Medicare SNF benefit during 1989, and thereby affect the behavior of providers of this service. For example, the elimination of the three-day prior hospital stay meant that persons who were in the community or already in nursing homes as Medicaid or private pay patients could receive the Medicare SNF benefit without having an intervening hospital admission. The number of covered days was increased from 100 days per spell of illness to 150 days per calendar year. This meant that a Medicare beneficiary could have a maximum, uninterrupted Medicare SNF stay of 300 days between two calendar years. The coinsurance policies were changed so that copayments equal to one-third of the cost of SNF care per day ($25.50 in 1989) was required only for the first eight days of a covered stay. Although the MCCA SNF provisions were implemented only in calendar year 1989, they had a pronounced effect on Medicare SNF expenditures that year.

Trends in Medicare SNF Use and Expenditures

In the initial years of the Medicare program, Medicare-covered SNF days were close to 1,000 per 1,000 enrollees. The high use of these services prompted administrative guidelines (in the form of coverage requirements) that greatly constrained the use of SNF services. In 1971, for example, only 361 covered days per 1,000 enrollees were provided. From 1981 until 1987, the number of covered days per enrollee declined steadily--to 221. After issuance of the coverage guideline clarification in 1988, days of care per 1,000 enrollees increased to 364. With the implementation of the MCCA in 1989, Medicare-covered SNF days jumped to 865 per 1,000 enrollees. Despite the major increase in 1989 over 1988, the number of days per 1,000 enrollees in

1989 was still below the level that prevailed in 1967. Even after the MCCA SNF provisions were repealed, Medicare-covered days per 1,000 did not return to pre-MCCA levels; in 1990 and 1991, covered days per 1,000 were approximately 640.

Medicare expenditures for the SNF benefit closely paralleled trends in utilization. In the early 1980s, annual payments were relatively small, both as a percentage of Medicare expenditures and as a proportion of total nursing home revenues. In 1983, Medicare SNF expenditures of $528 million accounted for about 2 percent of total national nursing home expenditures, and slightly less than 1 percent of total Medicare expenditures (DHHS, 1985). In 1987, the year preceding clarification of coverage guidelines, Medicare SNF expenditures were only $630 million and still less than 1 percent of total Medicare expenditures. SNF spending rose to $956 million in 1988, then more than tripled to $3.4 billion when the MCCA provisions were in effect in 1989. Although the MCCA was repealed by 1990, Medicare SNF expenditures that year were still $2.4 billion, indicating that expenditure levels did not return to pre-MCCA levels, even absent the incentives provided by the MCCA provisions. As we discuss later below, the unexpected high levels of expenditures after the repeal of the MCCA may reflect the maturation of the coverage guideline clarification issued in 1988 and other factors such as the new orientation of SNFs toward subacute care.

Medicare payments per enrollee for SNF services ranged from $9 to $19 between 1967 and 1987. In the early 1980s, expenditures per enrollee ranged between $14 and $17, indicating no change and, given the effects of inflation, a likely decline in payments per enrollee over this period. Payments per enrollee increased to $30 in 1988 and to $86 in 1989, declining to $54 in 1990.

Prior Research

The research presented in this report is the last of five analyses of the effects of changes to the Medicare SNF benefit resulting from administrative guidelines and the Medicare Catastrophic Coverage Act. Different databases distinguished the four preceding analyses, as described below.

SNF Facility-Level Changes 1987-1989. The first study (Liu and Kenney, 1993) used data from surveys of facilities included in the Medicare and Medicaid Automated Certification System (MMACS) to examine facility-level changes between 1987 and 1989 in patients' Medicare coverage on the day of the survey. That study found that the number of nursing home residents in Medicare-certified facilities who were covered by Medicare increased by 37 percent between 1987 and 1988 (before MCCA) and by 138 percent between 1988 and 1989 (during MCCA). That study also found that proprietary and larger SNFs were more likely than government-owned and smaller SNFs to begin to accept Medicare patients between 1987 and 1989.

Changes in Nursing Home Certification Status. The second study (Liu, Taghavi, and Cornelius, 1993) also used MMACS data to examine changes in certification status of Medicaid nursing homes between 1987 and 1989. That study found that the number of facilities certified only to provide ICF-level care declined between 1987 and 1989 in light of the expected implementation of the OBRA 1987 requirements. Researchers also found that between 1987 and 1989 the number of Medicare and Medicaid residents increased while the number of private pay patients remained the same.

Changes in Medicare SNF Use. The third study (Marsteller and Liu, 1994) used MEDPAR SNF data to examine changes in Medicare SNF utilization between 1987 and 1992--before, during, and after repeal of MCCA. Some of the results of that research are incorporated in this report to provide a backdrop for considering the changes found in the panel of nursing homes in this analysis.

That study found a higher level of Medicare SNF utilization in 1989 relative to both 1988 and 1990. Utilization measures included number of SNFs with Medicare-covered days, total covered days, length of stay, and admissions. Researchers also found that utilization began to grow again between 1990 and 1992.

Casemix Development and Analyses. The fourth study (Cornelius et al., 1995) used Medicare Provider Analysis and Review (MEDPAR) SNF data to develop and analyze a casemix classification system that provides an analog to the Resource Utilization Group (RUG) III casemix system that is being used in HCFA's multi-state nursing home demonstration project. The virtue of the MEDPAR analog is that it uses extant data that are available for all Medicare SNFs, permitting comparison of Medicare casemix across and within facilities over time. The Medicare casemix of SNF patients remained basically unchanged between 1987 and 1990 but increased in 1991 and 1992. That study also found that the Medicare SNF casemix in hospital-based and freestanding facilities converged between 1987 and 1992, raising question about the need for a dual system of SNF reimbursement.

This research report expands prior analyses by extending the time frame through 1991 and simultaneously using two data bases to produce an extensive array of measures, including the Medpar Casemix measure, thus providing a richer data set model to test in the analyses of changes. The incremental approach to the analysis produces insights that have resulted in a more comprehensive understanding of the interrelationships under study.

III. ANALYTIC APPROACH

Our study presents descriptive and multivariate analyses of changes in the nursing home industry between 1987 and 1991. The descriptive analyses show how Medicare SNF utilization changed over the period and assess the underlying components of growth. We examine transitions of nursing homes across different skill levels and study the changes in nursing home facility casemix and staffing. In our multivariate analyses, we investigate the factors associated with both the transitions of nursing homes in skill level certification and the changes in SNF utilization and casemix.

Effects of MCCA and Other Policies

National program-level statistics support the expectation that the MCCA SNF provisions that were in effect in calendar year 1989 and the clarifications regarding patient coverage issued in April 1988 would increase Medicare SNF use and expenditures. To study the relationship between implementation of those policies and consequent changes in providers and utilization of Medicare SNF services, we established three comparison periods: (a) the period before the implementation of the policies (1987); (b) the implementation period during which the MCCA and coverage guidelines were in effect (1989); and © the period after the MCCA provisions were repealed but the coverage guidelines were still in effect (1991). Our assessment of the influences of the policies was made by comparing changes between 1987 and 1989 to changes between 1989 and 1991 and by examining changes between 1987 and 1991.

Because of the chronological proximity of the issuance of the clarified guidelines and the 1989 implementation of the MCCA SNF provisions, independent effects of the two policies cannot be precisely estimated. This situation is particularly complicated in light of the uneven responses to the clarified guidelines by Medicare fiscal intermediaries (DHHS, 1991). As a result, it is possible that the major impact of the clarified guidelines regarding coverage occurred only after the MCCA provisions were in effect in 1989, or even after the MCCA repeal implemented in 1990.

In addition, the OBRA 1987 provisions had the potential to influence participation by nursing homes in the Medicare SNF program, principally because they required all nursing homes to meet Medicare certification requirements by 1990. Thus, many nursing homes, notably ICFs, which would have had to increase their staffing levels anyway, might have had additional incentives to participate in the Medicare SNF program. Because the OBRA 1987 provisions did not have to be met until after MCCA was repealed, we would expect that MCCA-related changes in the SNF program in 1989 would not have been as confounded by OBRA 1987 as they were by the clarified guidelines regarding coverage.

Although we cannot disentangle the effects of the MCCA from the other policies and changes that were occurring over the period, we try to gain an understanding of the MCCA effects by contrasting the changes between 1987 and 1989 to those occurring between 1989 and 1991. In general, we expected changes observed between 1987 and 1989 to reflect responses to the coverage changes and the MCCA, and changes observed between 1989 and 1991 to reflect the repeal of the MCCA and the implementation of the OBRA 1987 staffing requirements.

We expect the coverage changes and the MCCA to lead to increases between 1987 and 1989 in the proportion of facilities with Medicare-certified beds, in the number of Medicare-certified beds, and in the average number of Medicare stays per Medicare bed. Because of the breadth of the changes in the MCCA, we expect it to have greater impacts than the coverage changes in the 1987-1989 period. If the MCCA effects dominated the coverage effects, and there were no secular forces operating in both the 1987-1989 and 1989-1991 periods that led nursing homes to provide more Medicare SNF services, we would expect declines between 1989 and 1991 to offset increases that arose between 1987 and 1991. To the extent that increases between 1987 and 1989 are not offset by decreases between 1989 and 1991, one of several things is occurring: the coverage change effects were larger than anticipated; the MCCA, by familiarizing more nursing homes with Medicare, made nursing homes more willing to provide Medicare SNF services even after its repeal; or other factors were at play during both the 1987-1989 and 1989-1991 periods, such as the OBRA 1987 nursing home provisions, which raised nursing homes' willingness to participate in Medicare.

In sum, many of the changes between 1987 and 1989 in provider certification for Medicare, beds certified for Medicare, and Medicare utilization are associated with the MCCA provisions in 1989 governing changes in the copayment structure and removal of the prior hospital stay, and with the new coverage guidelines issued in 1988. We are unable to determine the precise impact of those policies because of secular trends in the nursing home industry and additional policies such as OBRA 1987 which raised staffing requirements. The influence of such factors became particularly apparent in the 1989-1991 period and contributed largely to the certification and utilization changes observed. The presence of such factors might explain why utilization levels in the post-MCCA period did not return to pre-MCCA levels.

Differential Responses by Providers and States

Our hypotheses regarding how facility, area and state policy characteristics affect changes in Medicare services are summarized in Figure 3.1. Past studies that have examined cross-sectional variation in Medicare SNF provision in nursing homes have shown that state policies and nursing home characteristics affect whether nursing homes have Medicare SNF patients (Bishop and Dubay, 1991; Liu and Kenney, 1993; Sulvetta and Holahan, 1986). On the basis of prior research, we expect there to be more transitions to Medicare status, greater likelihood of Medicare bed supply increases, and larger increases in Medicare use in proprietary facilities and in facilities with larger numbers of beds

Figure 3.1: Hypotheses About MCCA and Coverage Change Impacts

<table>
<tr><td>Expect MCCA to increase:
•Medicare-certified facilities
•Medicare-certified beds
•Medicare stays per bed
•Medicare length of stay
between 1987 and 1989</td><td>Expect coverage changes to increase:
•Medicare-certified facilities
•Medicare-certified beds
•Medicare stays per bed
between 1987 and 1991</td></tr>
<tr><td colspan="2">Largest response expected from:
•Proprietaries
•Chains
•Larger facilities</td></tr>
<tr><td colspan="2">Smaller response expected in areas with:
•Mandatory certification of Medicare beds
•Certificate of need or moratoria on nursing home supplies
•Greater Medicare bed supply
•Fewer hospital discharges</td></tr>
</table>

We also expect greater responsiveness among proprietary nursing homes that are part of chains than among other proprietaries, because the former are likely to be more cognizant of the Medicare changes and to have an easier time dealing with Medicare's fiscal intermediaries relative to other nursing homes. We used type of fiscal intermediary as a proxy for chain status, because chain facilities are concentrated among commercial intermediaries, in contrast to Blue Cross/ Blue Shield. We recognized the imprecision of this proxy indicator, but felt that important differences probably existed between chain and non-chain facilities in responses to both the Medicare SNF policies and to underlying secular trends in the nursing home industry.

We expect smaller increases in Medicare provision per bed when nursing homes are in states that have mandatory Medicare certification of SNF beds (i.e., Medicare maximization policies). Such nursing homes may not have chosen to have Medicare beds and may only participate because of the state's Medicare maximization policy. We expect fewer transitions in states with nursing home bed moratoria or Certificate-of-Need because adding Medicare beds may be more difficult in these states.

Our expectations regarding the effects of state Medicaid policies are somewhat complex. On the one hand, we expect nursing homes in states with higher Medicaid SNF reimbursement, retrospective reimbursement, and adjustments for casemix to be staffed to handle the heavier care needs of Medicare SNF patients. This should make them more likely to add Medicare beds or have larger increases in Medicare SNF provision per bed. At the same time, however, these forces may also make Medicaid a more attractive payer, reducing the shifts to Medicare service provision. How these conflicting forces balance out should influence the direction of the relationships observed.

We expect fewer transitions to Medicare status, smaller increases in Medicare bed supplies, and smaller increases in Medicare SNF provision per bed where there is more Medicare SNF availability in the local area (i.e., where there are more swing beds and Medicare SNF beds per elderly). We expect fewer transitions and fewer increases in Medicare SNF provision where demand for Medicare SNF care is less, that is., where there are fewer hospital discharges per Medicare-certified bed in the baseline period relative to areas with more hospital service use.

Data Sources

The major data sources for this study were Medicare SNF bills and the Medicare and Medicaid Automated Certification System (MMACS). Information from MMACS provided data on the characteristics of all Medicare and Medicaid nursing homes from 1987 through 1991, while Medicare SNF bills provided information on utilization of the Medicare SNF benefit during the same period. Other sources of data, including the area resource file (ARF) and specialized surveys, were used principally to elicit information on potential predictors of change in nursing homes' participation in the Medicare SNF program. Below we describe each data source and the process of constructing the analytical files for this study.

Medicare and Medicaid Automated Certification System (MMACS). MMACS files contain information on all nursing homes certified by Medicare and/or Medicaid. In 1987, for example, MMACS contained data on approximately 14,000 facilities. Nursing home data in the MMACS are derived from periodic (every 12 to 15 months) surveys on every Medicare- and Medicaid-certified facility. These surveys are conducted to determine that such providers meet conditions of participation standards in terms of health and safety standards, staffing, and appropriate care of patients.

MMACS files contain a record for each facility. The information on the record includes: provider number, name, street address, city, state, zip code; number of registered nurses, licensed practical nurses, nurses aides, and therapists; total patient census on the date of survey; payer status--Medicare, Medicaid, and private; and aggregate patient functional characteristics. In this study, we used a subset of nursing homes in the MMACS files, called the provider of service (POS) files. These files contain facility characteristics that, in addition to staffing patterns, include type of ownership (e.g., proprietary, nonprofit), Medicare/Medicaid certification status, and number of beds. The POS data provided the essential information to study changes in Medicare-certified SNFs and Medicare SNF beds.

Medicare Provider Analysis and Review (MEDPAR) File. MEDPAR contains Medicare Part A claims information aggregated into stays. All of the claims associated with a given SNF stay were concatenated to describe the number of Medicare-covered days, the charges for accommodations and other services, and the diagnoses and demographic characteristics of the beneficiaries. MEDPAR records also contain provider number and provider's Medicare fiscal intermediary. These data were analyzed for changes in Medicare-covered days, admissions, and casemix of Medicare SNF patients in Medicare- and Medicaid-certified providers.

Construction of Analytic Files

The analytic files were constructed to examine changes in the Medicare SNF program associated with the 1989 implementation of the SNF provisions of the Medicare Catastrophic Coverage Act, and other recent policies directed toward nursing homes, including clarified coverage guidelines and the 1987 OBRA staffing upgrade to ICFs, implemented in 1990. We developed files to provide information on periods before 1987, during 1989, and after the 1991 implementation of MCCA SNF provisions.

Because of our interest in examining changes in nursing home participation in the Medicare SNF program and changes in Medicare service use, it was necessary to include in the analytic files both Medicare-certified and non-Medicare-certified nursing homes. In this way, we could estimate, for example, the likelihood of transitions from non-Medicare-certified to Medicare-certified provider status. In contrast to estimating transitions in nursing home participation in the Medicare SNF program, analysis of changes in the provision of Medicare SNF services involved, by definition, only the subgroup of nursing homes that were certified to provide Medicare SNF services. Thus, the analysis results apply to different sets of nursing homes depending on the outcome variable of interest.

As a general strategy, we constructed the files by initially focusing on the data sets that contained the most inclusive number of nursing homes. We then appended to those records information from other sources. The MMACS files provided the data for the initial sample of all nursing homes in this study. For Medicare-certified facilities, data on utilization of Medicare SNF (from SNF MEDPAR) was concatenated with information on the facilities' characteristics. We also appended to the files other information indicating state-specific or market area-specific characteristics. Below is further detail on the construction of the files.

MMACS. The aim of this activity was to develop a longitudinal file of nursing homes for calendar years 1987 through 1991. All available historical MMACS data on surveys that were conducted for calendar years 1987 through 1991 were obtained from HCFA's Health Standards and Quality Bureau. We conducted initial computer matches by provider numbers to determine the number of nursing homes for records available for each calendar year.

For several reasons, records were not available for all nursing homes for all years between 1987 and 1991. Because intervals between the periodic surveys, from which the POS data were derived, exceeded 12 months in some cases, we found "skips" in calendar year data for some facilities. In other cases, new facilities had become Medicare or Medicaid providers during the 1987-1991 period, making prior year data unavailable. In still other cases, facilities closed during the 1987-1991 period, making subsequent year data unavailable.

In addition, when facilities changed certification status (from Medicaid ICF to Medicare SNF), their provider numbers also changed. In some cases, the variable "previous provider number" could be used to identify a facility when it changed certification status and received a new provider number. We found, however, that there remained too many cases in which records for the same facility could not be matched from year to year simply by using "previous provider number."

We employed several strategies to maximize the number of matching records for presumably the same facility, regardless of whether there was a certification change. An initial step involved printing out unconnected records of facilities by geographic area and survey date to determine if different years' records--with different provider numbers--for the same facility could be linked. Eventually, we resorted to developing a computerized matching scheme that employed numerous data items identifying a given facility (e.g., street number, street name, and multiple digits in the name of the facility). The last process provided the most reliable information on the most facility records from 1987 through 1991. The matched records of nursing homes from that process became the basis of our analysis files.

Prior to matching records across years, the MMACS files yielded records on 12,509 facilities in 1987; 12,317 facilities in 1988; 12,683 facilities in 1989; 1,530 facilities in 1990; and 10,971 facilities in 1991. We derived an analysis subset of providers for which MMACS surveys were conducted in the three periods of interest to this study (before, during, and after MCCA). The need to include only nursing homes that were surveyed in each year significantly reduced our available sample size. The final analysis subset included 8,031 facilities that were surveyed in 1987, 1988, 1989, and 1990 and/or 1991. The selected facilities are more stable than average, since both new facilities and facilities that went out of business were excluded from the sample, as were other facilities that did not have surveys in all of the years.

We combined data from surveys for 1990 and 1991 in our analysis. As can be seen above, an unusually small number of facilities were surveyed in 1990, which made it impossible to analyze data for that year separately. Instead, post-MCCA outcomes were measured using 1991 data, supplemented with data from 1990 surveys. We used data from 1991 surveys whenever available. For facilities not surveyed in 1991, we used data from the 1990 surveys.

In some instances, multiple surveys were conducted within a calendar year for a given facility. In that case, one survey was randomly selected for use in the analysis. The only exception related to the surveys for 1990 and 1991. If there were multiple 1990 surveys and no 1991 surveys, we used the last survey from 1990 in the analysis.

The MMACS was the source of data on outcomes such as change in certification status of facilities and number of certified beds, by type (Medicare, Medicaid SNF, Medicaid ICF). The MMACS was also used to develop several variables that reflect facilities' characteristics. These include control of ownership (proprietary, nonprofit, or government owned), type (freestanding or hospital-based), skill level (has both ICF and SNF beds), and facility size (number of Medicare beds). MMACS data were also used to indicate whether a state had a Medicare maximization policy by determining whether more than 89 percent of the SNF beds in a state were certified for Medicare. County identifiers on the MMACS data were used to determine the urban versus rural location of nursing homes based on county of location.

MEDPAR. MEDPAR data on Medicare-covered days were derived for facilities in the POS base files that had Medicare-covered days during the 1987-1991 period. For each calendar year, MEDPAR data were aggregated to the individual facility level by using provider numbers on the stay records. These records were then concatenated with the POS data for individual providers for each calendar year. In analyses of utilization, only SNFs with Medicare SNF days were included.

The MEDPAR data provided several measures of importance to the analysis. The first was total Medicare-covered days during a calendar year. The second was total number of admissions (or stays) during a calendar year. These measures were readily derived from the MEDPAR files. The third measure was of the casemix of Medicare patients who had Medicare-covered stays in each facility with Medicare-covered days. This measure characterized the casemix of only the Medicare stays for the facility and not the casemix of the overall patient population of the facility, which probably included Medicaid and private patients in addition to Medicare patients.

We derived the Medicare casemix measure by using data on therapy charges, patient diagnosis, and certain services of Medicare-covered stays for each facility. The classification of

MEDPAR stays was developed to be an analog to the Resource Utilization Group III casemix classification system used by HCFA's multi-state nursing home demonstration project, and was specifically created to use data from MEDPAR records (Cornelius et al., 1995). The facility-specific distributions of patients in terms of the MEDPAR classification scheme were weighted by a standard set of resource requirements corresponding to each category in the classification scheme. This yielded a summary measure reflecting the Medicare casemix for a facility in a given year. A detailed description of the methodology used to develop MEDPAR-based casemix information (Cornelius et al., 1995) is included in Appendix A.

The fourth variable of interest that was derived from MEDPAR files was the identification of the fiscal intermediary for a given Medicare SNF. In the analysis, fiscal intermediary was operationalized as the binary variable indicating whether it was a Blue Cross/Blue Shield organization or a commercial insurer such as AETNA or MUTUAL. Finally, we employed MEDPAR hospital stay data to derive the number of hospital discharges by market areas.

Other Data Sources. Other data sources included the University of California/San Francisco's Institute for Health and Aging (IHA) surveys, the Area Resource File, and the 1990 Census. In contrast to the facility-specific information from the MMACS and MEDPAR, we used information from other sources to provide state and county location characteristics that could have predicted changes in Medicare SNF program between 1987 and 1991.

The 1989 IHA and National Governors' Association State Medicaid Reimbursement Survey provided data on Medicaid SNF average per diem reimbursement levels, the Medicaid ICF average per diem reimbursement rate, and the reimbursement method used by a state (e.g., casemix adjusted or retrospective versus prospective). A 1990 IHA survey of state health planning agencies provided information on state policies regarding nursing home bed moratoria and certificate-of-need programs.

The Area Resource File provided data on the number of swing beds in 1988, and the 1990 Census provided data on the number of elderly persons. In both cases, the numbers applied to the county of location of the nursing home.

We appended the information from these data sources to the records for each nursing home in the POS-based analysis files. When multiple years' data were available on the variables (e.g., Medicaid reimbursement rates), those data were linked to the specific year's POS and MEDPAR data on that nursing home; otherwise, the state or county characteristic was considered constant over the comparison periods.

IV. NATIONAL OVERVIEW

Below we rely on descriptive statistics to characterize changes in the distribution of nursing homes and beds (both detailed by state), the composition of nursing home residents, and the number of registered nurses per bed, using MMACS. Because not all nursing homes are necessarily surveyed each year, the subset of facilities that we used in this analysis contains only homes for which survey data were available in calendar years 1987, 1989, and 1991. Because of a change in the survey process in 1990, there was a shortfall in surveys in 1991. As noted, despite our use of 1990 surveys to supplement 1991 surveys, relatively fewer surveys were available in those years than in preceding ones, even though the number of nursing homes actually increased each year since 1987. For example, the number of Medicare or Medicaid certified nursing homes was 14,955 in 1987; 15,409 in 1989; and 16,104 in 1992 (Chrest, 1995).

In light of data limitations, the MMACS statistics in this section are most useful for comparing changes between 1987 and 1989 and for examining differences in changes between categories of providers. In the next section of this report, we examine changes in a panel of nursing homes for which surveys were available in all three years (1987, 1989, and 1991).

We use the MEDPAR SNF files to address changes in Medicare SNF utilization by total admissions, covered days, length of stay, and the distribution of covered days across SNFs. Finally, we examine more closely the composition of Medicare SNF patients by principal diagnosis groups and casemix categories, across types of facilities. Unlike the MMACS data, MEDPAR files included data on all stays for each of the calendar years. Moreover, the MEDPAR files included stays in hospital swing beds, which are an alternative type of provider to nursing homes.

Changes in the Distribution of Nursing Homes

Using MMACS data, the distributions of surveyed nursing homes are reported by certification status, percentage of Medicare beds, and percentage of Medicaid patients. Detail by state is also reported. These data have ramifications for Medicare beneficiaries' access to the Extended Care Benefit, in that there may be too few Medicare-certified SNFs in an area, too few Medicare-certified beds available within the SNFs, or such a large population of Medicaid patients that Medicare patients are crowded out.

Table 4.1 shows the distribution of surveyed nursing homes by certification status for 1987, 1989, and 1991. It also compares changes across type of facility (hospital-based or freestanding) and type of ownership (proprietary, nonprofit, and government). The drop in the total number of nursing homes between 1989 and 1991 does not represent an actual decline in their number but a change in survey methodology.

Table 4.1: Number of Surveyed Nursing Homes by Medicare and Medicaid Certification Status 1987, 1989, and 1991*

	1987	1989	1991	1987-1989 % Change	1989-1991 % Change
All Homes					
Total	12,472	13546	12,883	8.61	-4.89
Medicare SNF	6,113	7483	7,883	22.41	5.35
Medicaid SNF	1,642	1434	1,147	-12.67	-20.01
Medicaid ICF	4,717	4629	3,853	-1.87	-16.76
Hospital-Based					
Total	823	1,136	1,134	38.03	-0.18
Medicare SNF	631	925	959	46.59	3.68
Medicaid SNF	76	88	84	15.79	-4.55
Medicaid ICF	116	123	91	6.03	-26.02
Freestanding					
Total	11,649	12,410	11,749	6.53	-5.33
Medicare SNF	5,482	6,558	6,924	19.63	5.58
Medicaid SNF	1,566	1,346	1,063	-14.05	-21.03
Medicaid ICF	4,601	4,506	3,762	-2.06	-16.51
Proprietary					
Total	8,443	8,943	8,664	5.92	-3.12
Medicare SNF	3,970	4,814	5,200	21.26	8.02
Medicaid SNF	1,003	793	620	-20.94	-21.82
Medicaid ICF	3,470	3,336	2,844	-3.86	-14.75
Nonprofit					
Total	3,180	3,708	3,335	16.60	-10.06
Medicare SNF	1,725	2,205	2,182	27.83	-1.04
Medicaid SNF	483	498	380	3.11	-23.69
Medicaid ICF	972	1,005	773	3.40	-23.08
Government					
Total	849	895	884	5.42	-1.23
Medicare SNF	418	464	501	11.00	7.97
Medicaid SNF	156	143	147	-8.33	2.80
Medicaid ICF	275	288	236	4.73	-18.06

Source: Urban Institute, MMACS files.
*Shortfall in 1991 surveys presents a downward bias in facilities that year.

Overall, the number of Medicare-certified SNFs grew while the number of facilities certified only for Medicaid declined. Freestanding facilities comprised by far the majority of nursing homes in all years. Between 1987 and 1989, the number of Medicare-certified hospital-based SNFs increased by almost half. By type of ownership, the highest growth was among nonprofit facilities, which recorded increases in both Medicaid- and Medicare-certified nursing homes, although Medicare growth far outstripped Medicaid growth.

Nationally, Medicare certification rose from 49 percent of surveyed nursing homes in 1987, to 55 percent in 1989 and 61 percent in 1991. The state-specific number of surveyed nursing homes and the percentage of those that are Medicare-certified are shown in Table 4.2. The percentage of nursing homes certified for Medicare between 1987 and 1989 rose in all but five states. The number of states with certification rates over 90 percent increased from four in 1987 to nine in 1991. Low certification rates are of particular interest, however, since this could be an indication of an access problem for Medicare beneficiaries. In four states in 1987, less than 10 percent of nursing homes were certified for Medicare: Oklahoma (5.5 percent), South Dakota (9 percent), Mississippi (6 percent), and Iowa (9.8 percent). In Mississippi, there were only eight Medicare-certified nursing homes, and in South Dakota, only nine. By 1991, Oklahoma was still under the 10 percent mark, Iowa had only 14 percent, but Mississippi and South Dakota had increased to 29 and 27 percent, respectively.

An ample number of SNFs in a state does not necessarily mean that beneficiaries can easily find a place in one. Another indication of access to the Extended Care Benefit is the percentage of beds in Medicare SNFs that are Medicare-certified. Table 4.3 shows the numbers and percentages of Medicare SNFs that had various percentages of certified beds in 1987, 1989, and 1991. In almost half the SNFs, more than 90 percent of beds are certified for Medicare in all three years.

Table 4.2: State-Specific Number of Surveyed Nursing Homes and Medicare SNFs as Percentage of Total 1987, 1989, and 1991

	1987		1989		1991	
	Number	Medicare Percent	Number	Medicare Percent	Number	Medicare Percent
United States Total	12,472	49.01	13,546	55.24	12,883	61.19
Alabama	189	91.01	187	92.51	181	95.58
Alaska	12	50.00	14	57.14	12	50.00
Arizona	71	100.00	107	99.07	95	97.89
Arkansas	223	14.80	233	19.31	201	21.39
California	988	85.83	1,009	89.49	914	88.51
Colorado	171	51.46	184	64.67	171	73.10
Connecticutt	204	76.96	220	72.27	197	81.73
Delaware	33	69.70	33	78.79	36	77.78
District of Columbia	9	55.56	8	75.00	12	66.67
Florida	409	79.95	457	88.62	415	88.92
Georgia	275	29.09	319	58.62	274	64.96
Hawaii	30	73.33	31	74.19	37	81.08
Idaho	51	98.04	57	98.25	58	100.00
Illinois	582	44.33	656	50.15	671	51.71
Indiana	374	38.50	421	42.76	488	50.82
Iowa	408	9.80	407	12.04	413	13.80
Kansas	342	12.28	346	17.63	358	22.07
Kentucky	185	43.78	206	43.69	237	75.53
Louisiana	263	15.97	282	23.40	294	20.75
Maine	141	12.77	141	13.48	124	20.16
Maryland	157	60.51	187	76.47	172	76.16
Massachusetts	460	28.04	494	35.43	470	61.91
Michigan	376	68.88	365	72.33	312	71.79
Minnesota	339	76.11	403	79.16	374	89.04

	1987		1989		1991	
	Number	Medicare Percent	Number	Medicare Percent	Number	Medicare Percent
Mississippi	131	6.11	141	24.82	133	29.32
Missouri	337	38.28	397	52.39	367	67.03
Montana	75	81.33	88	89.77	75	88.00
Nebraska	191	14.14	202	19.80	187	20.86
Nevada	23	86.96	28	92.86	29	93.10
New Hampshire	67	20.90	68	19.12	64	23.44
New Jersey	250	61.20	248	62.50	249	72.29
New Mexico	58	29.31	60	31.67	56	44.64
New York	562	94.13	571	94.05	440	99.55
North Carolina	192	79.69	227	81.94	258	91.09
North Dakota	74	72.97	72	76.39	70	91.43
Ohio	734	45.23	827	52.60	775	58.97
Oklahoma	344	5.52	367	8.17	339	9.44
Oregon	119	34.45	150	54.67	134	61.19
Pennsylvania	528	84.09	589	87.61	584	91.44
Rhode Island	100	64.00	99	68.69	72	79.17
South Carolina	108	75.93	123	82.93	122	95.08
South Dakota	100	9.00	112	12.50	92	27.17
Tennessee	250	35.20	260	41.54	267	50.94
Texas	957	23.82	1019	31.21	996	39.36
Utah	83	59.04	82	62.20	70	62.86
Vermont	37	32.43	42	47.62	38	47.37
Virginia	169	42.01	207	48.31	230	60.87
Washington	182	42.86	251	52.59	243	69.55
West Virginia	76	39.47	98	47.96	97	53.61
Wisconsin	405	35.56	419	42.48	352	50.28
Wyoming	28	32.14	32	56.25	28	78.57

Source: Urban Institute, MMACS files

Table 4.3 Distribution of Medicare SNFs by Medicare Beds as Percentage of Total Beds: 1987, 1989, and 1991

Medicare Percent	1987		1989		1991	
	Number	Percent	Number	Percent	Number	Percent
< 10%	535	8.75%	362	4.84%	485	6.15%
10-19	872	14.26	1,203	16.08	1,455	18.46
20-29	646	10.57	1,164	15.56	1,076	13.65
40-49	357	5.84	548	7.32	570	7.23
40-49	191	3.12	279	3.73	303	3.84
50-59	350	5.73	436	5.83	374	4.74
60-69	205	3.35	231	3.09	145	1.84
70-79	138	2.26	152	2.03	94	1.19
80-89	65	1.06	67	.90	43	0.55
90+	2,754	45.05	3,041	40.64	3,336	42.32
Total	6,113	100%	7,483	100%	7,883	100%

Source: Urban Institute, MMACS files.

Table 4.4 examines the percentage of all surveyed certified facilities (Medicare and Medicaid) in which less than half of the patients are Medicaid patients. Nationwide, the percentage of facilities with less than 50 percent Medicaid patients rose between 1987 and 1989 and fell between 1989 and 1991, but the changes were not dramatic. There is greater variation across years by state, perhaps because state Medicaid policies differ. In Alaska, for example, there are no certified facilities with less than 50 percent Medicaid patients, in any of the three years examined. At the other extreme, 99 percent of certified Arizona facilities in 1987 had less than 50 percent Medicaid business. That percentage dropped to 65 percent in 1989 and 45 percent in 1991. A similar rapid decline occurred in Delaware. Iowa and Kansas saw very little change in the percentage of certified facilities with less than half of patients being paid for by Medicaid. Both states hovered around 50 percent for the three years, although Kansas did see a decline from 57 to 50 percent over the entire period.

Changes in the Distribution of Beds

Using MMACS data, the distribution of nursing home beds can be described nationally and by state. The following tables highlight differences in bed-certification status across type of ownership and type of facility.

The apparent drop in the total number of certified beds between 1989 and 1991 (Table 4.5) is an artifact of the change in the survey process in 1990-1991. Between 1987 and 1989, Medicare-certified beds increased over the study period while certified beds in Medicaid-only facilities decreased. Increases in Medicare beds were largest in hospital-based facilities, which also expanded Medicaid-only SNF beds, and in nonprofit facilities, which expanded certification of Medicare SNF beds, Medicaid-only SNF beds, and Medicaid ICF beds. Freestanding and proprietary facilities showed the largest decreases in Medicaid-only beds.

Table 4.4: State-Specific Percentage of Surveyed Facilities with Less than 50 Percent Medicaid Patients: 1987, 1989, and 1991

	1987	1989	1991
United States Total	26.61%	27.83%	23.46%
Alabama	16.40	16.04	12.71
Alaska	0.00	0.00	0.00
Arizona	98.59	65.42	45.26
Arkansas	14.35	15.45	12.94
California	43.93	38.35	32.93
Colorado	22.81	25.00	22.22
Connecticutt	26.47	26.82	16.24
Delaware	72.73	69.70	47.22
District of Columbia	0.00	12.50	8.33
Florida	35.94	37.64	30.60
Georgia	10.91	11.29	7.66
Hawaii	23.33	22.58	16.22
Idaho	27.45	17.54	22.41
Illinois	40.03	44.36	38.30
Indiana	22.46	25.65	17.83
Iowa	52.70	53.56	52.30
Kansas	57.31	52.60	50.00
Kentucky	16.22	20.39	15.19
Louisiana	11.03	14.18	14.97
Maine	5.67	5.67	4.84
Maryland	26.11	29.41	28.49
Massachusetts	12.83	12.15	8.51
Michigan	16.49	19.45	16.03
Minnesota	24.48	28.54	19.25
Mississippi	3.82	7.80	6.02

	1987	1989	1991
Missouri	31.45	34.76	28.07
Montana	26.67	23.86	25.33
Nebraska	56.54	63.86	49.73
Nevada	17.39	28.57	13.79
New Hampshire	29.85	27.94	14.06
New Jersey	28.80	28.63	26.91
New Mexico	20.69	23.33	16.07
New York	13.35	11.56	9.09
North Carolina	13.02	18.50	17.83
North Dakota	31.08	30.56	28.57
Ohio	24.25	23.46	20.39
Oklahoma	21.51	28.07	19.76
Oregon	23.53	22.00	17.91
Pennsylvania	44.70	46.86	41.27
Rhode Island	17.00	19.19	16.67
South Carolina	11.11	22.76	22.13
South Dakota	35.00	36.61	27.17
Tennessee	17.20	18.85	17.98
Texas	13.38	18.25	15.76
Utah	15.66	17.07	11.43
Vermont	29.73	23.81	15.79
Virginia	20.71	28.50	21.30
Washington	21.43	21.91	13.17
West Virginia	13.16	15.31	17.53
Wisconsin	16.05	17.90	13.64
Wyoming	10.71	15.63	3.57

Source: Urban Institute, MMACS files.

Table 4.5: Total Number of Beds in Surveyed Facilities by Medicare and Medicaid Certification Status: 1987, 1989, and 1991*

	1987	1989	1991	1987-1989 % Change	1989-1991 % Change
All Homes					
All Beds	1,251,887	1,362,033	1,303,601	8.80	-4.29
Medicare SNF	710,162	852,076	881,815	19.98	3.49
Medicaid SNF	173,543	147,121	114,318	-15.23	-22.30
Medicaid ICF	368,182	362,836	307,468	-1.45	-15.26
Hospital-Based					
All Beds	48,621	63,769	64,219	31.16	0.71
Medicare SNF	36,810	51,140	52,173	38.93	2.02
Medicaid SNF	5,705	6,648	7,418	16.53	11.58
Medicaid ICF	6,106	5,981	4,628	-2.05	-22.62
Freestanding					
All Beds	1,203,266	1,298,264	1,239,382	7.90	-4.54
Medicare SNF	673,352	800,936	829,642	18.95	3.58
Medicaid SNF	167,838	140,473	106,900	-16.30	-23.90
Medicaid ICF	362,076	356,855	302,840	-1.44	-15.14
Proprietary					
All Beds	847,537	905,429	882,927	6.83	-2.49
Medicare SNF	470,662	561,146	595,549	19.22	6.13
Medicaid SNF	104,029	80,836	60,434	-22.29	-25.24
Medicaid ICF	272,846	263,447	226,944	-3.44	-13.86
Nonprofit					
All Beds	298,462	349,134	315,085	16.98	-9.75
Medicare SNF	179,267	225,782	218,277	25.95	-3.32
Medicaid SNF	46,650	47,745	35,173	2.35	-26.33
Medicaid ICF	72,545	75,607	61,635	4.22	-18.48
Government					
All Beds	105,888	107,470	105,589	1.49	-1.75
Medicare SNF	60,233	65,148	67,989	8.16	4.36
Medicaid SNF	22,864	18,540	18,711	-18.91	0.92
Medicaid ICF	22,791	23,782	18,889	4.35	-20.57

Source: Urban Institute, MMACS file.

*Shortfall in 1991 surveys present a downward bias in nursing home beds that year.

State-specific percentages of Medicare-certified beds are presented in Table 4.6. Of the total number of certified nursing home beds (Medicare and Medicaid), the percentage that are certified for Medicare increased between 1987 and 1989 and between 1989 and 1991. Mississippi (5.7 percent), Oklahoma (1.3 percent), Arkansas (9 percent) and Iowa (6.75 percent) had very low percentages of beds certified for Medicare in 1987. By 1991, Oklahoma was the only state in which less than 10 percent of total beds were certified for Medicare, but the three other states were still well below the national average.

Table 4.7 shows the number of Medicare-certified nursing home beds for every 1,000 Medicare enrollees, by state, over the study period. Since we know that the number of certified beds increased and the number of enrollees in a state would not be affected by the MCCA, we would expect the ratio of certified beds per 1,000 enrollees to improve between 1987 and 1989. Overall, the ratio improved by four beds per 1,000 in that period and stayed roughly constant between 1989 and 1991, but again, the 1991 numbers likely understate true increases. By state, the number of certified beds per 1,000 Medicare enrollees increased in all but seven states between 1987 and 1989. Some, including Arizona, Arkansas, Georgia, Mississippi, Oklahoma, and Wyoming, more than doubled.

In some states, the 1987 ratio was so low that the 1987-1989 increase was probably not very helpful from an access point of view. In Oklahoma there was less than one bed for every 1,000 Medicare enrollees in 1987; in Mississippi, two; in Arizona, three. The ratios in these states improved, but several states still have fewer than ten certified beds per 1,000 Medicare enrollees. These states include Arkansas, Iowa, Mississippi, and Oklahoma (which has less than six certified beds for every 1,000 Medicare-enrolled Oklahomans). It is important to note that many of these states have large rural areas where hospital swing beds also provide Medicare SNF services. Swing-

Table 4.6: State-Specific Number of Nursing Home Beds and Medicare Beds as Percentage of Total: 1987, 1989, and 1991

	1987		1989		1991	
	Number	Medicare Percent	Number	Medicare Percent	Number	Medicare Percent
United States Total	1,215,887	56.73%	1,362,033	62.56%	1,303,601	67.64%
Alabama	19,111	94.56	18,939	95.26	18,965	96.77
Alaska	612	72.55	705	70.64	624	65.22
Arizona	1,138	100.00	11,437	99.48	10,799	99.30
Arkansas	19,651	8.99	21,092	15.30	18,667	19.07
California	91,669	88.30	95,050	91.13	85,657	88.48
Colorado	15,948	58.49	17,287	72.23	15,219	78.49
Connecticutt	23,477	85.95	25,241	77.64	23,855	86.17
Delaware	3,367	67.27	3,451	86.96	3,577	86.47
District of Columbia	1,962	71.71	1,731	84.46	2,134	74.60
Florida	45,858	83.64	51,210	90.75	45,926	92.38
Georgia	28,156	29.76	33,294	57.67	29,461	65.18
Hawaii	2,326	68.10	2,489	73.32	3,060	77.94
Idaho	3,776	98.81	4,583	99.02	4,569	100.00
Illinois	67,387	47.33	75,254	52.88	78,422	55.82
Indiana	35,961	52.16	40,495	55.84	48,370	63.20
Iowa	28,962	6.75	28,983	8.88	30,176	12.10
Kansas	22,992	13.71	22,780	17.91	24,733	24.77
Kentucky	14,916	48.10	16,446	49.29	19,142	79.10
Louisiana	29,179	13.05	30,616	20.75	32,621	16.69
Maine	9,376	17.84	9,531	18.78	8,574	25.26
Maryland	19,260	71.59	23,256	84.69	20,980	84.19
Massachusetts	41,184	38.49	45,427	46.27	44,889	76.15
Michigan	40,970	76.08	39,633	79.14	34,924	77.29
Minnesota	34,275	85.41	41,474	87.59	39,203	92.93

	1987		1989		1991	
	Number	Medicare Percent	Number	Medicare Percent	Number	Medicare Percent
Mississippi	12,323	5.66%	12,854	25.25%	12,706	28.08%
Missouri	31,316	39.19	35,877	55.46	34,396	69.12
Montana	5,225	81.21	6,148	89.30	5,353	87.71
Nebraska	14,657	17.02	15,192	21.73	14,635	28.53
Nevada	2,251	91.83	2,848	97.61	2,957	92.90
New Hampshire	6,310	21.76	6,297	19.44	6,365	21.81
New Jersey	34,675	65.55	34,427	67.52	35,835	77.59
New Mexico	5,335	39.59	5,103	34.37	5,137	48.16
New York	93,216	95.38	94,867	94.82	73,474	99.76
North Carolina	18,274	85.11	20,881	86.45	24,660	93.28
North Dakota	6,182	79.20	6,009	81.78	5,911	94.37
Ohio	64,325	58.98	72,942	65.72	62,886	69.32
Oklahoma	26,298	1.33	28,652	4.73	28,046	8.88
Oregon	9,665	43.78	12,103	62.17	10,990	72.06
Pennsylvania	68,268	88.08	73,377	92.65	76,225	94.78
Rhode Island	9,163	82.71	9,613	84.36	7,283	87.16
South Carolina	9,941	81.83	11,359	85.76	11,136	94.97
South Dakota	6,881	13.59	7,818	18.62	6,625	35.18
Tennessee	26,869	37.72	28,793	44.85	31,312	57.00
Texas	93,396	27.86	98,108	34.25	93,886	40.75
Utah	6,459	74.55	6,397	75.47	5,591	77.02
Vermont	2,553	49.35	3,215	66.03	2,596	61.67
Virginia	21,100	50.71	24,551	54.26	25,258	65.17
Washington	18,162	51.41	23,818	60.19	23,947	74.26
West Virginia	6,650	43.13	8,424	51.47	7,922	56.08
Wisconsin	48,779	44.30	49,430	50.78	41,485	58.56
Wyoming	2,101	32.84	2,526	58.67	2,437	84.24

Source: Urban Institute, MMACS files.

Table 4.7: State-Specific Medicare-Certified Nursing Home Beds per 1,000 Medicare Enrollees: 1987, 1989, and 1991*

	1987	1989	1991
United States Total	24.21	28.22	28.35
Alabama	34.03	32.91	32.35
Alaska	23.84	23.28	16.74
Arizona	2.90	27.29	25.46
Arkansas	4.84	8.67	9.30
California	32.05	34.17	29.77
Colorado	33.76	43.49	39.14
Connecticutt	47.72	45.92	46.09
Delaware	28.72	36.28	35.54
District of Columbia	19.92	21.16	23.39
Florida	20.14	23.07	20.50
Georgia	12.60	27.82	26.59
Hawaii	21.36	22.22	22.24
Idaho	31.31	36.73	35.25
Illinois	23.32	28.72	30.87
Indiana	27.66	32.07	42.00
Iowa	4.61	6.02	8.38
Kansas	9.73	12.17	17.78
Kentucky	14.88	16.35	29.76
Louisiana	7.88	12.72	10.57
Maine	9.79	10.25	12.05
Maryland	28.78	39.69	34.11
Massachusetts	21.11	27.41	44.11
Michigan	28.39	27.11	22.50
Minnesota	76.65	83.50	81.37
Mississippi	2.03	9.27	9.94

	1987	1989	1991
Missouri	17.17	27.48	32.02
Montana	39.56	49.42	40.60
Nebraska	11.24	14.75	18.34
Nevada	23.04	25.87	22.47
New Hampshire	11.08	9.56	10.38
New Jersey	22.79	23.03	26.86
New Mexico	15.18	11.43	15.33
New York	39.44	40.19	32.37
North Carolina	19.47	21.54	25.99
North Dakota	53.85	52.20	58.22
Ohio	27.25	33.44	29.43
Oklahoma	0.85	3.18	5.68
Oregon	13.30	23.06	23.51
Pennsylvania	33.84	37.46	38.79
Rhode Island	52.68	56.31	44.51
South Carolina	20.68	23.45	24.12
South Dakota	9.06	13.82	21.67
Tennessee	16.10	19.72	26.21
Texas	15.93	19.73	21.60
Utah	35.30	33.34	27.87
Vermont	18.20	30.04	21.98
Virginia	16.91	20.16	23.70
Washington	18.59	27.62	33.10
West Virginia	11.13	16.42	16.27
Wisconsin	32.96	37.51	35.42
Wyoming	15.30	31.11	40.51

Source: Urban Institute, MMACS files, and HCFA denomination files.

*Shortfall in 1991 surveys presents a downward bias in beds/enrollee that year.

bed providers would compensate for some of the lower rates observed when only looking at Medicare SNF beds.

Changes in the Composition of Residents

In addition to structural changes that nursing homes made in response to the MCCA, they also underwent notable changes in the composition of residents. The MCCA effectively expanded eligibility by removing the requirement of a three-day prior hospital stay before using the Extended Care Benefit. While some new patients may have come into nursing homes because of the MCCA, nursing homes may also have switched existing patients from Medicaid or private payment to Medicare coverage.

Table 4.8 supports this notion by showing changes in the payment source composition of patients in Medicare-certified SNFs for 1987, 1989, and 1991. Note that in all three years, the majority of patients were Medicaid beneficiaries. The percentage of patients paid for by Medicare is very small (at 3.3 percent in 1987), increases dramatically in 1989 (to 9.3 percent), and decreases again in 1991 (to 6.3 percent), clearly showing the effect of the MCCA. The percentage of Medicare patients in 1991, though down from 1989, is twice the 1987 rate. The percentage of patients with other payment sources decreased all three years.

By ownership and facility type, the patterns in the percentages of Medicare patients mimic the overall trend. Each sub-group of facilities saw an increase in the percentage of Medicare patients between 1987 and 1989, and a decrease between 1989 and 1991. In Table 4.9, the number of patients in each type of facility is the total number present at the time of the certification survey. The percentages of patients paid for by Medicare are shown in the neighboring column. Between 1987 and 1989, proprietary facilities saw the largest increase (262 percent) in Medicare patients, although nonprofit and government facilities were not far behind. Similarly, growth in the

Table 4.8: Changes in the Payment Source Composition of Patients in Medicare-Certified SNFs: 1987, 1989, and 1991

	1987	1989	1991	Percent Change 1987-1989	Percent Change 1989-1991
Number of Patients					
Medicare	21,497	71,143	50,662	230.94%	-28.79%
Medicaid	411,826	471,625	536,738	14.52	13.81
Other	216,595	223,805	217,620	3.33	-2.76
Total	649,918	766,573	805,020	17.95	5.02
Percentage					
Medicare	3.31%	9.28%	6.29%	180.58%	-32.19%
Medicaid	63.37	61.52	66.67	-2.91	8.37
Other	33.33	29.20	27.03	-12.40	-7.41
Total	100.00	100.00	100.00	0.00	0.00

Source: Urban Institute, MMACS Files.

Note: Number of patients is the number present in facility on the date of the certification survey.

Table 4.9: Changes in the Percentage of Medicare Patients in Medicare-Certified SNFs: Group-Specific Percentages

	1987		1989		1991		Percent Change in Medicare Patients	
	No. of Patients	Percent Medicare	No. of Patients	Percent Medicare	No. of Patients	Percent Medicare	1987-1989	1989-1991
Type of SNF								
Hospital-Based	30,247	12.19%	43,198	20.00%	44,698	18.66%	134.28%	-3.44%
Freestanding	619,671	2.87	723,375	8.64	760,322	5.57	250.95	-32.29
Ownership								
Nonprofit	166,223	4.10	207,376	9.38	201,015	7.78	185.80	-19.60
Proprietary	429,090	2.99	499,658	9.30	542,101	5.92	262.34	-31.00
Government	54,605	3.41	59,539	8.74	61,904	4.77	179.74	-43.33

Source: Urban Institute, MMACS files

Note: Number of patients is the number present in facility on the date of the certification survey.

percentage of patients paid for by Medicare was much larger for freestanding facilities than for hospital-based nursing homes. Freestanding facilities also reported a larger decrease in Medicare patients between 1989 and 1991. By ownership, however, government facilities reported the largest decrease in Medicare patients between 1989 and 1991, with proprietary facilities coming second.

Table 4.10 shows Medicare patients as a percentage of Medicare beds and as a percentage of total beds, respectively. Overall, Medicare patients represented 10.4 percent of all Medicare beds in 1987, 28 percent in 1989, and 21 percent in 1991. The pattern is the same (at much smaller magnitudes) for Medicare patients as a percentage of total beds. This suggests that Medicaid and other non-Medicare patients occupied the majority of Medicare-certified beds in each year.

All types of facilities in all regions saw an increase in Medicare patients as a percentage of Medicare beds between 1987 and 1989. Increases were larger among freestanding facilities, proprietary nursing homes, and facilities located in the Pacific and East South Central regions. Percentages dropped between 1989 and 1991 for all facility types and in all regions, except for hospital-based facilities and facilities in the West South Central regions, which saw Medicare patients as a percentage of Medicare beds increase very slightly.

Changes in Registered Nurses Per Bed

Table 4.11 shows the ratios of registered nurses (RNs) to beds by facility certification for 1987, 1989, and 1991. Overall, RNs per bed stayed constant between 1987 and 1989 but rose slightly in 1991. This pattern holds true within each type of certification. In the first two years, certified facilities as a group had an average of 0.08 RNs per bed, but by 1991 that number had increased to 0.13 RNs per bed.

By certification status, Medicare SNFs had the highest ratio of RNs to beds in all three years, as would be expected given the stricter Medicare staffing requirements. Not surprisingly, skilled

Table 4.10: Medicare Patients as Percentage of Medicare-Certified Beds and Total Beds, by Selected Characteristics of Medicare SNFs: 1987, 1989, and 1991

	1987		1989		1991	
	% of Medicare Beds	% of Total Beds	% of Medicare Beds	% of Total Beds	% of Medicare Beds	% of Total Beds
All Homes	10.42	5.14	27.99	11.26	20.92	8.84
Type of SNF						
Hospital-Based	9.17	3.59	27.74	9.03	19.67	6.18
Freestanding	21.26	18.55	29.77	27.06	29.91	28.02
Ownership						
Proprietary	8.19	5.57	16.71	10.95	12.27	9.40
Nonprofit	11.55	8.11	22.96	14.66	20.99	13.06
Government	10.16	3.80	31.38	9.73	21.72	7.02
Census Region						
New England	8.36	3.83	18.91	7.34	10.88	5.38
Mid-Atlantic	5.79	3.06	15.46	7.95	10.85	5.91
South Atlantic	7.80	3.10	26.72	9.23	20.69	7.43
East N. Central	8.49	4.23	25.81	10.74	23.41	9.78
East S. Central	10.74	5.52	34.88	13.93	17.33	7.49
West N. Central	14.78	6.99	33.27	14.33	27.38	11.27
West S. Central	15.09	11.02	29.70	17.38	29.79	16.53
Mountain	18.48	10.46	36.25	10.30	24.61	9.22
Pacific	13.94	5.78	38.75	14.05	24.58	8.99

Source: Urban Institute, MMACS files.

Table 4.11: RN/Bed Ratios by Certification Status of Facility:
1987, 1989, and 1991

	1987	1989	1991
All	0.08	0.08	0.13
Facility Status			
Medicare SNF	0.11	0.11	0.14
Medicaid SNF	0.07	0.07	0.12
Medicaid ICF	0.04	0.04	0.11

Source: Urban Institute, MMACS Files

nursing facilities had much higher staffing levels than intermediate care facilities. In 1987 and 1989, Medicaid SNFs had 0.07 RNs per bed compared to 0.04 RNs per bed in Medicaid ICFs. The OBRA 1987 staffing requirements discussed earlier became effective in 1990, and by 1991 the RN-to-bed ratio for Medicaid ICFs was almost equivalent to the Medicaid SNF ratio, at 0.11 and 0.12, respectively.

Changes in Medicare SNF Utilization

Between 1987 and 1992, the Medicare Extended Care Benefit saw increases in overall admissions, covered days, and length of stay (LOS). Despite this expansion in the number of patients receiving SNF benefits, the across state and across facility patterns suggest a persisting lack of access to SNF care for some Medicare beneficiaries.

Using the MEDPAR SNF file, we generated total admissions, covered days, and covered days per admission (or LOS) from 1987 to 1992 for all types of SNFs (see Table 4.12). Between 1987 and 1992, Medicare-covered SNF days increased by 247 percent. The greatest number of covered days occurred in 1989; the increase to more than twice the number of covered days in 1988, is a clear result of the MCCA. A significant drop in covered days in 1990, upon the repeal of the MCCA, was followed by two years of steady increase, although covered days in 1992 still did not match the 1989 level. Recent statistics indicate that covered days in 1993 exceeded the 1989 level.

Similar patterns appear in the number of admissions over the study period. From 1987 to 1992, admissions increased 176 percent. Like covered days, the number of admissions in 1989 was nearly twice its level in 1988, and dropped in 1990. Levels in 1992 have surpassed the 1989 mark, however, by 13 percent.

Covered days per admission increased from 21.96 in 1987 to 27.66 in 1992. In 1989, LOS jumped to 35.96, then fell to 27.80 in 1990. Since 1990, covered days per admission has remained

Table 4.12: Total Admissions, Covered Days, and Covered Days per Admission

	1987	1988	1989	1990	1991	1992
Number of SNFs	8,134	8,666	9,875	10,345	11,237	11,906
Admissions	332,608	447,254	810,770	707,910	800,723	917,526
Covered Days	7,303,936	12,019,798	29,157,000	19,677,383	22,394,908	25,374,388
Covered Days/Admission	21.96	26.87	35.96	27.80	27.97	27.66

Source: Urban Institute, MEDPAR SNF files.

Table 4.13: Total Medicare-Covered Days (TCD) by Type of SNF Over Time

	1987 TCD	%	1988 TCD	%	1989 TCD	%	1990 TCD	%	1991 TCD	%	1992 TCD	%
Hospital-Based	1,664,859	22.79	2,290,210	19.05	3,633,353	12.46	3,041,292	15.46	3,732,505	16.67	3,995,096	15.74
Free-standing	5,139,080	70.36	9,218,518	76.69	24,755,205	84.90	15,991,004	81.27	17,923,557	80.03	20,617,959	81.25
Swing-bed	429,944	5.89	503,035	4.19	759,117	2.60	637,693	3.24	725,320	3.24	680,125	2.68
Don't Know	70,053		8,035		9,325		7,394		13,526		81,208	
All	7,303,936	100	12,019,798	100	29,157,000	100	19,677,383	100	22,394,908	100	25,374,388	100

Source: Urban Institute, MEDPAR SNF files.

g:\liuk\6146-06\iv-12&13.tbl May 25, 1995 stable at just below 28 days. The decline in LOS after the repeal of the MCCA is likely due to higher copayments, which caused patients to leave the SNF earlier.[1] Covered days per admission remained higher than it was in 1988, however.

One utilization trend that communicates both the relative number of each provider type and their market shares is total covered days. Table 4.13 shows total and percentage of covered days for freestanding, swing-bed, and hospital-based skilled nursing facilities. In 1987, swing-bed facilities handled 5.89 percent of all SNF covered days, hospital-based SNFs handled 22.79 percent, and freestanding facilities handled 70.36 percent. In 1992, the percentage shares were 2.68, 15.74, and 81.25 percent, respectively.

Overall, total covered days increased for all facility types from 1987 to 1989, dropped in 1990, and returned to a rising pattern through 1992. Covered days for swing-bed facilities dropped in 1992, however. The effect of the MCCA is evident in the increase in covered days between 1988 and 1989 in all facilities. Total covered days in swing-bed and hospital-based SNFs increased by 50.9 and 58.65 percent, respectively, but freestanding facilities showed a 168.54 percent growth in covered days. While this rate is three times the rates of growth for the other types of facilities, the repeal of the MCCA resulted in a decrease of covered days in freestanding facilities that was only twice the decreases for the other facilities. From 1989 to 1990, covered days in freestanding facilities decreased by 35.4 percent, compared to a 16 percent decrease in swing-bed days and a 16.3 percent decrease in hospital-based SNF days. As a result, freestanding SNFs were left with a higher share of total covered days than before the MCCA.

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[1] The Medicare SNF copayment, which begins after the 20th day, is one-eighth the hospital deductible ($81.50 in 1992). The MCCA had lowered the copayment to $25.50 for the first eight days and nothing thereafter.

Since 1990, the percentage of total covered days handled by each type of facility has been fairly stable. From 1990 to 1991, covered days in hospital-based facilities increased by 22.73 percent compared to the freestanding gain of only 12.09 percent, which expanded the hospital-based share of the market for that year. Between 1991 and 1992, however, covered days in freestanding facilities increased 15 percent, while hospital-based days increased by only 7 percent; swing-bed covered days fell 6.23 percent.

We also examined covered days per admission, or length of stay. LOS is detailed for each facility type in Table 4.14. Swing-bed facilities have the shortest average LOS--only 12.59 days in 1992. This makes sense given the nature of swing beds, which offer short-term recovery from an acute episode. Hospital-based facilities averaged 18.56 covered days per admission in the same year. In every year examined, patients in freestanding SNFs have stayed longer than patients in the other types of SNFs. In 1992, freestanding LOS was 31.98, almost twice as long as hospital-based LOS and almost three times as long as swing-bed LOS.

The patterns of LOS by facility type show very little change in the LOS in swing-bed hospitals over the study period. Swing-bed LOS only increased by one day between 1987 and 1989 (7.42 percent), dropped by one and a half days in 1990 (10.22 percent), and has changed by only partial days since then. Hospital-based and freestanding SNFs showed larger variation in LOS between 1987 and 1992. LOS in freestanding facilities increased by sixteen days (65.76 percent) between 1987 and 1989, dropped by nine days in 1990 (21.82 percent), and remained steady after that. Hospital-based SNF LOS increased by six days (30.38 percent) between 1987 and 1989, declined by five days in 1990 (20.29 percent), and dipped again in 1992, by one and a half days (7.39 percent).

Table 4.14: Length of Stay by Hospital-Based, Freestanding, and Swing-Bed Providers

	1987	1988	1989	1990	1991	1992
Hospital-Based	19.32	21.13	25.19	20.08	20.04	18.56
Freestanding	24.33	30.54	40.33	31.53	32.08	31.98
Swing-Bed	13.47	13.71	14.47	12.99	13.13	12.59
Don't Know	21.43	25.43	46.86	42.01	31.90	23.42
All	21.96	26.87	35.96	27.80	27.97	27.66

Source: Urban Institute, MEDPAR SNF files.

Changes in the Composition of Medicare SNF Patients

Using the MEDPAR SNF files, Medicare SNF patients can be described in terms of diagnoses and casemix to shed light on whether the kinds of patients admitted to SNFs changed with the passage of the MCCA or the revision of the guidelines in 1988. As mentioned above, LOS, or Medicare-covered days, increased during the MCCA and fell after its repeal, largely because the MCCA lowered beneficiary copayments. The 1988 revision of the intermediaries' guidelines may have expanded the number of covered patients in some diagnoses by clarifying the rules for coverage.

Changes in the number of SNF admissions and in length of stay for Medicare patients in selected principal diagnoses (all fairly common) are shown in Table 4.15. Overall, SNF admissions increased dramatically between 1987 and 1989 and fell somewhat between 1989 and 1991, and LOS showed the same pattern. Trends over the study period vary by diagnosis, however. For neoplasm, diabetes, conditions of the nervous system, and cerebrovascular disease, SNF admissions followed this general pattern. SNF admissions for injuries and poisonings, respiratory disease, other circulatory diseases, and fractures of the femur all increased steadily between 1987 and 1991. Between 1987 and 1989, LOS increased across the board, and fell between 1989 and 1991 for all diagnoses. LOS in 1991 remained longer than it had been in 1987 for all diagnoses except conditions of the nervous system.

The percentage changes in admissions and LOS highlight the diagnoses where changes occurred most rapidly. Admissions for conditions of the nervous system and respiratory disease each roughly doubled from 1987 to 1989, which is a small change compared to admissions for diabetes, which increased 689 percent in that period. The average length of stay for diabetes admissions increased by 125 percent between 1987 and 1989. Although diabetes admissions and

Table 4.15: Changes in Number of SNF Admissions and Length of Stay (LOS) of Medicare Beneficiaries by Principal Diagnosis Groups: 1987, 1989, and 1991

							% Change		% Change	
Principal Diagnosis (ICD9-CM)	1987		1989		1991		1987-1989		1989-1991	
	# of Admits	LOS	# of Admits	LOS	# of Admits	LOS	# of Admits	LOS	# of Admits	LOS
TOTAL	331,854	28.64	809,587	42.00	800,597	30.30	143.96%	46.66%	-1.11%	-27.86%
Neoplasm (140-239)	24,021	21.81	49,309	28.98	47,558	24.56	105.27	32.82	-3.55	-15.23
Diabetes (250)	135	45.03	959	85.16	289	52.75	610.37	89.13	-69.86	-38.06
Nervous System (320-389)	9,402	44.04	31,026	60.25	23,492	40.66	229.99	36.81	-24.28	-32.51
Cerebrovascular Disease (436-438)	43,096	34.15	91,619	51.04	80,082	38.58	112.59	49.47	-12.59	-24.42
Other Circulatory System Diseases (390-435, 439-459)	34,669	27.61	91,701	38.41	97,778	28.82	164.50	39.11	6.63	-24.96
Respiratory Disease (460-519)	22,917	25.52	65,095	33.06	68,319	26.12	184.05	29.58	4.95	-20.99
Fracture of Femur (820)	836	28.62	789	40.59	531	37.53	-5.62	41.80	-32.70	-7.53
Other injuries & poisonings (800-819, 821-999)	25,031	27.79	59,024	35.96	61,832	30.66	135.80	29.40	4.76	-14.75
All Others	171,747	28.10	420,065	43.13	420,716	29.74	144.58	53.48	0.15	-31.05

Source: Urban Institute, MEDPAR SNF files.

LOS also fell by the largest percentages between 1989 and 1991, the changes are of much smaller magnitude. The MCCA may have had an effect on diabetes admissions, in that some "admissions" were probably already patients of the SNF who became eligible for Medicare coverage following the passage of the MCCA. In addition, the 1988 coverage guidelines used diabetes as a specific example of a condition that should be covered by the benefit. As a result, SNFs were more likely to submit claims for coverage of persons with diabetes due to less chance of a retroactive denial.

Using the MEDPAR analog to the RUG-III Nursing Home Resident Classification System, Table 4.16 presents the percentage of Medicare residents in each casemix category for each year from 1987 to 1992. Patients in the High and Very High Rehabilitation categories use the most resources, in terms of nursing and staff time, of all the classifications. Note that the percentage of residents in the High and Very High Rehabilitation categories increases steadily across the study period. For example, the proportion of patients in the Very High Rehabilitation category increased from 2.38 percent in 1987 to 10.25 percent in 1991. Except for a small drop in 1989, the Medium Rehabilitation category follows the same pattern. In the 1990s, the only groups increasing relative to others are Medium, High, and Very High Rehabilitation. This result is consistent with reported industry trends toward greater provision of subacute rehabilitation care.

States differ in the percentages of Medicare residents receiving High or Very High levels of rehabilitation. Using the MEDPAR casemix analog, Table 4.17 shows the percentages of Medicare patients classified in the two categories combined for each state for 1987, 1989, and 1991. For the nation. the percentage of residents in these categories increases over the years examined, most dramatically between 1989 and 1991. The pattern holds true for all but three states. South Carolina and Massachusetts saw declines in 1987-1989 and recovery in 1989-1991, although Massachusetts

Table 4.16: Percentage Distribution of Casemix Categories of Medicare SNF Patients: 1987 - 1992

	1987	1988	1989	1990	1991	1992
Very High Rehabilitation	2.38%	3.20%	3.90%	6.70%	10.25%	14.14%
High Rehabilitation	4.88	5.89	6.58	8.86	11.12	12.52
Medium Rehabilitation	9.92	10.53	9.51	12.39	13.67	14.18
Low Rehabilitation	23.84	22.80	17.71	20.65	20.49	19.43
Extensive Services	0.92	0.94	1.12	1.11	0.89	0.75
Special Care	15.39	14.89	16.11	14.62	12.77	11.27
Clinically Complex	14.61	13.70	15.17	12.24	10.32	9.13
Impaired Cognition	0.70	0.91	1.56	1.23	1.15	1.15
Not Otherwise Classified	27.37	27.14	28.35	22.20	19.32	17.43
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00
TOTAL NUMBER IN YEAR	331,854	446,426	809,587	707,176	800,723	917,526

Source: Urban Institute, MEDPAR SNF files.

Table 4.17: Percentage of Medicare SNF Users with High or Very High Rehabilitation Use, by State: 1987, 1989, and 1991

	1987	1989	1991
United States Total	8.2%	12.9%	24.8%
Alabama	4.2	9.3	25.7
Alaska	17.4	21.6	25.7
Arizona	4.6	12.4	28.8
Arkansas	4.6	9.0	16.5
California	14.2	19.6	37.4
Colorado	9.5	22.2	35.5
Connecticutt	3.5	10.4	20.9
Delaware	3.5	10.4	32.0
District of Columbia	4.5	13.5	26.9
Florida	11.9	20.7	41.0
Georgia	6.4	14.0	30.3
Hawaii	4.0	5.0	15.6
Idaho	1.9	6.5	16.5
Illinois	8.5	12.2	22.2
Indiana	5.4	12.2	26.9
Iowa	2.6	4.9	9.4
Kansas	4.1	6.7	11.6
Kentucky	2.7	7.6	20.0
Louisiana	9.4	11.2	16.3
Maine	21.9	28.0	23.9
Maryland	8.0	7.9	20.3
Massachusetts	31.1	15.6	25.1
Michigan	6.6	11.8	22.4
Minnesota	2.8	9.0	18.2
Mississippi	4.1	10.0	15.3

	1987	1989	1991
Missouri	5.8378%	11.4983%	20.0943%
Montana	3.6614	5.7088	11.5481
Nebraska	2.9943	5.3772	8.7799
Nevada	8.2380	19.1489	33.3170
New Hampshire	9.3651	14.2857	24.4142
New Jersey	8.9200	13.8974	27.0693
New Mexico	10.9709	15.8664	23.8950
New York	3.6642	5.5287	9.6783
North Carolina	7.9792	13.4701	20.8254
North Dakota	2.3562	4.0340	6.5026
Ohio	2.9111	8.0036	19.0747
Oklahoma	4.2097	7.5063	13.3080
Oregon	9.1319	13.9710	26.0837
Pennsylvania	11.4082	15.1979	27.1955
Rhode Island	3.2291	7.6505	17.7057
South Carolina	20.2193	18.0853	27.8561
South Dakota	1.6327	2.3196	6.7730
Tennessee	15.1589	17.1952	28.3761
Texas	4.4217	10.1137	19.9750
Utah	7.9974	17.6794	26.6104
Vermont	5.4878	7.7851	14.7225
Virginia	7.3778	11.4335	25.5121
Washington	3.4789	10.6119	29.0878
West Virginia	5.3591	10.3976	14.4988
Wisconsin	9.2365	15.4881	29.1201
Wyoming	2.2676	5.5102	14.1829

Source: Urban Institute, MEDPAR SNF files.

did not regain its 1987 high. Maine saw an increase in High and Very High Rehabilitation patients between 1987 and 1989 but a decrease between 1989 and 1991.

In 1987, only nine states had more than 10 percent of their Medicare patients in the High or Very High Rehabilitation categories, while in 1991, almost all states had more than 10 percent of their Medicare patients in these categories. This may be due in part to the way the MEDPAR analog is constructed and to the effect of inflation on the price of therapy services since 1987.[2] Given the size of the difference between 1987 and 1991 in the Rehabilitation percentages, however, it seems unlikely that inflation alone would explain the increase. An increase in the rehabilitation needs of hospital discharges or changes in treatment patterns are likely contributors to the jump in the High and Very High Rehabilitation categories.

Some states had extremely low percentages of residents in these categories even after four years of rapid growth. These states include Iowa (9.4 percent), Nebraska (8.7 percent), New York (9.7 percent),[3] North Dakota (6.5 percent), and South Dakota (6.7 percent). Such low rates are striking given that the national average in 1991 was 25 percent. States with unusually high percentages of residents receiving intensive therapy in 1991 included Florida (41 percent), California (37 percent), and Colorado (35.5 percent).

Table 4.18 shows an across-the-board increase in Medicare SNF casemix over time. Measured using nursing staff time, casemix in skilled nursing facilities has increased over the past

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[2] The analog uses charges for therapy to classify Medicare patients. If there are any therapy charges above $200, patients are considered rehabilitation patients. The greater the charges (and the greater the variety of therapies used), the higher the resource use assumed. The charge ranges that determine the classification are based on the costs of therapy in 1993. It is possible that so few residents attained the highest two charge levels in 1987 because of the differences in the 1987 and 1993 prices for therapy services. In such an event, more residents would fall into these ranges with the passage of time and inflation.

[3] Many SNFs in New York report rehabilitative therapy as part of the all-inclusive SNF per diem rate, which reduces the number of residents with therapy charges large enough to get them into the top two Rehabilitation categories.

Table 4.18: Average Casemix Index by Provider Type:
1987-1992

	1987	1988	1989	1990	1991	1992
Hospital-Based	1.16	1.17	1.19	1.20	1.23	1.23
Freestanding	1.12	1.13	1.13	1.17	1.18	1.20
Swing-Bed	1.16	1.17	1.17	1.19	1.20	1.21
Don't Know	1.15	1.06	1.13	1.29	0.81	1.11
All	1.13	1.14	1.14	1.17	1.19	1.20

Source: Urban Institute, MEDPAR SNF files.

Note: Index based on MEDPAR analog to RUG-III classification system.

six years.[4] In 1987 overall nursing casemix was 1.13. By 1992 this number had grown to 1.20. This suggests two trends. First, as hospital length of stay decreased in response to PPS, patients were sent to recover in SNFs on an accelerated schedule. Patients discharged earlier in the course of an episode of illness are often sicker than patients SNFs had received in the past. Second, medical and technological advances have made it possible to care for more serious illnesses outside the hospital environment. The number of SNF patients in the most resource-intensive resident categories has grown relative to the number of SNF patients in other categories. Higher casemix involves the need for more sophisticated equipment, greater staff time, longer lengths of stay, and therefore less patient turnover, all of which require greater expenditures on the part of the SNFs.

The MCCA does not appear to have caused any change in the steady growth in casemix over time. Consistent with prior research (Shaughnessy et al., 1985), hospital-based SNFs have the highest casemix. Since they are units within hospitals, they can handle complex cases requiring intensive care at a level not unlike hospital inpatient care.

Although casemix for freestanding facilities is the lowest, it grew rapidly--by .07 points--between 1989 and 1992. It may soon catch hospital-based casemix, which showed only a .03 point increase from 1989 to 1992, with no change between 1991 and 1992. This result has raised questions regarding the need for separate payment rates for hospital-based and freestanding facilities. A high casemix indicates a more complex group of patients receiving nursing services (but no therapy). These patients are likely to be in the Extensive Services or Special Care groups, which include people receiving parenteral feeding or respirator assistance, as well as burn, coma, and quadriplegic patients.

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[4] This analysis is also subject to some reservations regarding inflation between 1987 and 1993.

In sum, the data in this section indicated growth in the number of Medicare-certified SNFs and beds between 1987 and 1991. In large part because of the OBRA 1987 requirements, nurse-to-bed ratios had become equal by 1991 across all types of nursing homes. Medicare SNF utilization, in terms of covered days, increased between 1987 and 1989, declined between 1989 and 1990, and began to climb again after 1990. By 1992, the number of Medicare SNF stays had exceeded the number in 1989, when MCCA provisions were in effect. The greatest growth in utilization was observed among freestanding SNFs, which provided four-fifths of all Medicare SNF covered days in 1992 (see Table 4.13). The casemix severity of Medicare SNF patients has been increasing since 1990, largely as a result of increasing proportions of patients who are receiving extensive rehabilitation services. Wide geographic variations in Medicare SNF beds and utilization were still present in 1991, suggesting that access to Medicare's Extended Care Benefit continued to be uneven across the United States.

V. PANEL ANALYSIS

In this section we present results from an analysis of a panel of certified nursing homes for which MMACS survey data were available for each of three years, 1987, 1989, and 1991. Unlike the prior section, the results presented here apply to longitudinal changes in a subset of the same facilities for the 1987-1991 period. One reason we used a panel was to avoid problems with survey discontinuities in 1990-1991, which precluded clear comparisons of changes between 1987 and 1991. The selection of the panel also permits an examination of changes and responses for a fixed set of facilities to avoid bias from relying on shifting cross-sections of facilities. To meet the criterion of having a survey in each of the three years, the size of the group was reduced from approximately 12,000 to 8,000. We conducted both descriptive and multivariate analyses.

Descriptive Analysis

The descriptive analysis addresses changes in Medicare certification of nursing homes, changes in utilization of Medicare SNF services, and the relationships between capacity for providing SNF services and utilization. We examine changes between 1987 and 1991, as well as changes for the two component periods, 1987-1989 and 1989-1991. Changes in the former period reflected, in part, a direct response to the MCCA SNF provisions, while changes in the latter reflected the withdrawal of the MCCA incentives, further effects of the coverage changes, and secular changes in the growth of the Medicare SNF program. For purposes of analysis, we have classified facilities in a hierarchical fashion. Facilities with any Medicare-certified beds are classified as a Medicare SNF (these facilities can have non-Medicare SNF and ICF beds). Facilities with SNF beds that are not certified for Medicare are classified as non-Medicare SNFs (these facilities also can have ICF beds). Facilities that only have ICF beds are classified as ICFs.

Transitions in Certification Status of Nursing Homes. Table 5.1 shows changes in certification status and skill level between 1987 and 1989 and between 1989 and 1991. Several patterns are of interest in the certification transitions. First, there were very few transitions among the facilities that were already Medicare-certified in 1987 or in 1989. Only a handful of Medicare-certified nursing homes did away with their Medicare beds between 1987 and 1991. Over the four-year period, fewer than 3 percent of the Medicare facilities shifted to the other categories.

Overall, there were net gains in the number of facilities certified for Medicare, as the number of Medicare-certified facilities in our sample grew from 3,925 to 4,645. Although few Medicare-certified facilities stopped having Medicare-certified beds, 12 percent decreased the number of beds certified for Medicare between 1987 and 1989, and 17 percent did the same between 1989 and 1991 (not shown). Medicare facilities were more likely to increase and less likely to decrease Medicare

Table 5.1: Transitions in Certification Status of Nursing Homes:
1987-1989 and 1989-1991

1987	1989			
	Medicare SNF	Medicaid SNF	Medicaid ICF	Total
Medicare SNF	3,838 (98%)	55 (1%)	32 (1%)	3,925
Medicaid SNF	248 (24%)	766 (74%)	15 (2%)	1,029
Medicaid ICF	150 (5%)	67 (2%)	2,860 (93%)	3,077
Total	4,236 (53%)	888 (11%)	2,907 (36%)	8,031

1989	1991			
	Medicare SNF	Medicaid SNF	Medicaid ICF	Total
Medicare SNF	4,195 (99%)	31 (1%)	10 (0%)	4,236
Medicaid SNF	263 (30%)	623 (90%)	2 (0%)	888
Medicaid ICF	187 (6%)	2,346 (81%)	374 (13%) *	2,907
Total	4,645 (58%)	3,000 (37%)	386 (5%)	8,031

* Given the mandates in OBRA 1987, there should have been no remaining ICFs in the 1990/1991 survey year.

bed supplies between 1987 and 1989 than they were between 1989 and 1991. This may reflect responsiveness to the MCCA provisions and retrenchment after its repeal.

In both periods, Medicaid SNFs were more likely than ICFs to become Medicare SNFs. About a quarter of the Medicaid SNFs became Medicare SNFs in each of the two periods, while only about 5 percent of the ICFs became Medicare SNFs. This pattern may occur because the Medicaid SNFs already had staff configurations that more closely meet the Medicare guidelines than do ICFs.

Focusing on the ICFs, there are very few transitions between 1987 and 1989. Fully 93 percent of the facilities that were ICFs in 1987 remained ICFs in 1989. The picture changes when we examine the later period, when only 13 percent of the 1989 ICFs remained ICFs in 1991. Of the ICFs that switched into another group, over 90 percent became non-Medicare SNFs. The number of ICFs in our sample dropped from 3,077 in 1987 to 374 in 1991. The dramatic reductions in ICFs are likely a direct consequence of the OBRA 1987 provisions regarding nursing homes, but there does not seem to be a major carryover to Medicare from this requirement.

Changes in Bed Supply. Table 5.2 shows the distribution of Medicare beds across different types of nursing homes in 1987, 1989, and 1991. When all facilities in our sample are considered together, we find that the number of beds certified for Medicare increased from 251,824 to 290,545. The number of beds certified for Medicare grew at a rate of 4.6 percent between 1987 and 1989; the 10.3 percent growth rate occurring in the 1989-1991 period was more than twice as high as that in the earlier period. Growth was uneven across different types of facilities. Hospital-based nursing homes added Medicare beds at much higher rates than did freestanding homes, especially in the 1987-1989 period. While proprietary nursing homes still accounted for the majority of Medicare-certified beds in 1991 (57 percent of all Medicare beds in 1991 were in proprietary nursing homes),

Table 5.2: Changes in Number of Beds Certified for Medicare:
1987, 1989, and 1991

	1987 Number of Beds Certified	1989 Number of Beds Certified	1991 Number of Beds Certified	Percent Change	
				1987-1989	1989-1991
All Nursing Homes	251,824	263,339	290,545	4.6%	10.3%
Hospital-Based	16,483	23,113	27,346	40.2	18.3
Freestanding	235,341	240,225	263,199	2.1	9.6
Proprietary	153,474	152,799	166,474	-0.4	8.9
Nonprofit	75,209	83,675	91,780	11.3	9.7
Government	23,141	26,866	32,288	16.1	20.2
Urban	198,342	203,722	221,706	2.7	8.8
Rural	53,484	59,619	68,837	11.5	15.5

Source: Urban Institute combined 1987, 1989, and 1990/1991 Provider of Service files.

nonprofit and government nursing homes gained Medicare beds at higher rates relative to proprietary nursing homes. Proportionately more Medicare beds were added in rural than in urban areas in both periods. The number of rural beds certified for Medicare grew at over 10 percent in both periods.

By 1991, 58 percent of all the facilities in our subset had Medicare-certified beds. The share with Medicare beds rose by 18 percent, from 49 percent in 1987. Table 5.3 shows the proportion of facilities in 1987 and 1991 with Medicare beds by residential location and region. There were increases in the proportion of facilities with Medicare beds in all regions in both rural and urban areas. Still, large regional disparities persist. For example, within rural areas, only 17 percent of the facilities in the West South Central region had Medicare-certified beds in 1991 compared to 96 percent in the Middle Atlantic region; similarly large differences existed between the two regions in urban areas.

Nurse-to-Bed Ratio. Dovetailing changes in certification status were changes in staffing. Taken as a whole, the facilities in our sample became more able to serve patients with heavier care needs, particularly over the 1989-1991 period. Between 1987 and 1989, the average number of registered nurses per bed actually declined slightly in our sample facilities. Between 1989 and 1991, however, the RN-to-bed ratio increased by over 50 percent. Because the 1989-1991 period was characterized by so much change, we analyze changes in RN-to-bed ratios for different types of facilities.

Table 5.4 shows the registered nurse-to-bed ratios in 1989 and 1991 in SNF-only facilities, multilevel SNF/ICF facilities, and ICF-only facilities (defined as such in 1989). Before the implementation of OBRA 1987 staffing requirements, ICF staffing per bed was one-third that of the ratio in SNF-certified facilities. By 1991, the staffing ratios were raised to meet the mandate. As

Table 5.3: Proportion of Facilities with Medicare-Certified Beds in 1987 and 1989 by Urban/Rural Location and Region

	Residential Location and Year			
	Rural		Urban	
Region	1987	1991	1987	1991
New England	0.20	0.31	0.42	0.60
Middle Atlantic	0.94	0.96	0.87	0.89
South Atlantic	0.52	0.71	0.67	0.78
East North Central	0.41	0.44	0.51	0.56
East South Central	0.39	0.58	0.55	0.70
West North Central	0.2[illegible]	0.3[illegible]	0.51	0.6[illegible]
West South Central	0.10	0.17	0.23	0.31
Mountain	0.51	0.66	0.65	0.77
Pacific	0.60	0.78	0.82	0.88

Source: Urban Institute Combined 1987, 1989, and 1990/91 Provider of Service files.

NOTE: Urban and rural combined proportions were 0.49 in 1987 and 0.58 in 1991.

Table 5.4: Registered Nurse-to-Bed Ratios in 1989 and 1991
According to Facility Certification Status in 1989

	Registered Nurse-to-Bed Ratio	
Facility Type	1989	1991
SNF/No ICF	0.11	0.12
SNF with ICF	0.06	0.10
ICF only	0.04	0.11

Source: Urban Institute Combined 1987, 1989, and 1990/91 Provider of Service files.

expected, there was little increase (8 percent) in the RN-to-bed ratio among the SNF-only facilities. In contrast, RN-to-bed ratios were three times as high in 1991 compared to 1989 among facilities that had been ICFs in 1989, and 1.7 times as high among facilities that had had both SNF and ICF beds in 1987. These patterns suggest that the increase in RN-to-bed ratios between 1989 and 1991 represent a response to the requirements embodied in OBRA 1987. They also indicate that the nursing home industry may be much better able to deal with patients with heavier care needs at the end of the period under study than it was at the outset.

Utilization. Table 5.5 shows how Medicare utilization per bed changed between 1987 and 1991. The average number of Medicare days per Medicare bed tripled between 1987 and 1989, rising from 30.3 to 92.4. By 1991, the number of days per bed had fallen to 64.1, which was still over twice as high as its 1989 level. Similar patterns emerged for changes in stays per bed and length of stay. Large increases occurred between 1987 and 1989, which were followed by decreases between 1989 and 1991 of a smaller magnitude. While these patterns were followed to some extent by different types of facilities, the net increase between 1987 and 1991 in Medicare service provision was significantly greater for some types of facilities. Particularly large increases in days per bed were observed among proprietary and freestanding nursing homes and among those likely to be chains (because they report to non-Blue Cross Blue/Shield Intermediaries). For these last nursing homes, the average number of Medicare days per bed was 2.4 to 2.7 times as high in 1991 as in 1987.

Casemix. The capacity of SNFs to provide services for heavier care patients, as reflected by the RN-to-bed ratio, corresponded directly to trends in the casemix of Medicare patients over the study period. Casemix of Medicare SNF patients was derived by using the MEDPAR analog to the RUG III classification system (Cornelius et al., 1995). Table 5.6 presents the MEDPAR SNF

Table 5.5: Medicare Utilization Per Bed by Characterics of SNFs:
1987-1991

Characteristics	1987 (N = 3,646)			1989 (N = 4,106)			1991 (N = 4,418)		
	Days	Stays	LOS	Days	Stays	LOS	Days	Stays	LOS
All	30.3	1.5	25.0	92.4	2.6	43.6	64.1	2.3	33.4
Proprietary	28.2	1.3	24.5	102.6	2.7	43.7	70.4	2.3	33.8
Nonprofit	36.1	1.9	25.8	75.3	2.6	42.1	54.3	2.3	31.9
Government	27.1	1.5	27.3	61.2	1.9	49.2	37.5	1.7	35.7
Hospital-Based	71.5	4.3	22.9	107.6	5.2	36.0	90.3	5.0	28.8
Freestanding	25.8	1.2	25.2	90.7	2.3	44.5	61.1	2.0	33.9
BC/BS Intermediary	32.5	1.6	26.0	77.1	2.3	45.2	52.3	2.0	33.3
Other Intermediaries	27.5	1.3	23.8	111.5	3.0	41.5	78.1	2.5	33.6

Source: Urban Institute MEDPAR files.

Table 5.6: Casemix Indices by Nursing Home Characteristics: 1987-1991

CHARACTERISTIC	1987 (N = 3,646)	1989 (N = 4,106)	1991 (N = 4,418)
All	1.12	1.13	1.18
Proprietary	1.13	1.14	1.20
Nonprofit	1.11	1.13	1.16
Government	1.11	1.12	1.16
Hospital-based	1.16	1.18	1.21
Freestanding	1.12	1.13	1.18
Blue Cross/Blue Shield Intermediary	1.12	1.14	1.17
Other Intermediary	1.12	1.12	1.20

Source: Urban Institute MEDPAR files.

Note: Index based on MEDPAR Analog to RUG III (Cornelius et al., 1985).

casemix index for the SNFs with Medicare use in 1987, 1989, and 1991, by selected facility characteristics. As with the RN-to-bed ratios, we found a very small increase in average Medicare casemix between 1987 and 1989, and a relatively larger increase in casemix between 1989 and 1991--the latter probably due to the implementation of OBRA 1987 provisions in 1990. This is consistent with descriptive statistics presented in Section IV indicating increases in the proportion of Medicare SNF patients receiving rehabilitation services in the early 1990s. For all providers, the index value remained essentially the same between 1987 and 1989. In contrast, the casemix index increased from 1.13 to 1.18 for all providers between 1989 and 1991. The subgroups of nursing homes showing greatest increases in casemix between 1989 and 1991 were proprietary facilities, freestanding facilities, and those with commercial insurers for intermediaries.

The results in Table 5.6 suggest that, on average, the MCCA did not cause an increase in Medicare casemix severity, because there was effectively no change in the casemix index between 1987 and 1989. On the other hand, the increase in the casemix index between 1989 and 1991 is consistent with the new orientation of some Medicare SNFs toward heavier care patients who need rehabilitation and other subacute care services.

Decomposition of Growth in SNF Utilization. Table 5.7 shows how Medicare bed availability and use changed between 1987 and 1991. The number of Medicare SNFs grew by 21 percent while the number of certified beds grew by 15 percent. In contrast, Medicare-covered days increased by 172 percent between 1987 and 1991. The growth in covered days is attributable to both increases in the number of stays (107 percent) and days per stay, i.e., length of covered stays (31 percent).

After decomposing the growth in Medicare-covered stays into the part due to increases in stays per bed and the part due to increases in Medicare beds, we found that more than three-quarters

Table 5.7: Percentage Change in Medicare SNF Participation and Service Provision Between 1987 and 1991

Service Indicator	Percentage Change		
	1987-1991	1987-1989	1989-1991
Medicare-Certified SNFs	21%	13%	8%
Medicare-Certified Beds	15	5	10.3
Medicare-Covered Days	172	293	-31
Medicare-Covered Stays	107	136	-12
Days per Stay	31	67	-21
Stays per Bed	80	126	-20

Source: Urban Institute combined 1987, 1989, and 1990/91 Provider of Service files.

of the growth is due to the higher number of Medicare stays per bed. As a result, less than a quarter is due to greater number of Medicare-certified beds.

We also found that most of the growth in Medicare SNF provision was related to the greater use of existing bed stock, because so many Medicare-certified beds in 1987 were not being used for Medicare patients. Instead, those beds were occupied by Medicaid and private pay patients. When we examine the extent to which Medicare beds are being used to their full extent for Medicare patients--defined as having 365 Medicare days per Medicare bed--we see that there was a tremendous amount of Medicare capacity unused for Medicare, even in 1991. Assuming that full Medicare use of a Medicare bed involves 365 Medicare days per Medicare bed, only 4 percent of the capacity was used in 1987. By 1991, 9 percent of the Medicare SNF capacity was being used, leaving considerable room for greater SNF provision within the existing supply of Medicare-certified beds.

While much of the growth in Medicare SNF provision was due to greater use of existing bed stock, 10 percent of all Medicare-reimbursed stays in our sample facilities in 1991 were in facilities that had not provided any skilled care to Medicare beneficiaries. Table 5.8 shows the sources of growth in Medicare bed availability and provision of services according to the facility's skill level in 1987.

Of all the Medicare-certified facilities in our sample in 1991, 77 percent had Medicare-covered stays in 1987. The remaining 23 percent are accounted for by facilities that in 1987 were ICFs, non-Medicare SNFs, or Medicare SNFs that had provided no Medicare-covered services. Of the facilities gaining Medicare-certified stays between 1987 and 1991, 41 percent had been non-Medicare SNFs, 35 percent had been ICFs, and 24 percent had been Medicare-certified facilities that had not been providing Medicare services in 1987.

Table 5.8: Medicare SNF Provision in 1991 According to Facility Skill Level in 1987

	Facility Type in 1987				
Service Indicators	Medicare SNFs in 1987 with Medicare Stays	Medicare SNFs in 1987 with No 1987 Medicare Stays	Non-Medicare SNF in 1987	ICF in 1987	Total
Medicare SNFs	3,590 (77.3%)	251 (5.4%)	432 (9.3%)	372 (8.0%)	4,645
Medicare Beds	248,068 (85.4%)	13,119 (4.5%)	16,324 (5.6%)	13,034 (4.5%)	290,545
Medicare Stays	284,516 (89.1%)	7,897 (2.5%)	16,750 (5.2%)	10,133 (3.2%)	319,296
Medicare Days	8,593,772 (88.4%)	253,115 (2.6%)	552,555 (5.7%)	320,033 (3.3%)	9,719,475
Stays per Bed	2.40	1.35	1.88	1.76	n.a.
Days per Stay	33.20	35.44	34.03	33.70	n.a.

Source: Urban Institute combined 1987, 1989, and 1990/91 Provider of Service files.

The Medicare facilities that had Medicare-covered stays in 1987 had more certified beds per facility and more stays per bed relative to the other Medicare-certified facilities in 1991. While they constituted 77 percent of all Medicare facilities in 1991, they accounted for 85 percent of all Medicare-certified beds and 89 percent of all Medicare stays. Thus, in spite of increases in the number of facilities providing Medicare-covered services between 1987 and 1991, 1991 Medicare bed supplies and service provision levels were heavily concentrated in facilities that had already been providing Medicare SNF services in 1987.

Multivariate Analysis

The multivariate analysis extends the descriptive analysis and examines factors associated with changes in facility certification, Medicare SNF beds, utilization, and casemix. Our analysis builds on previous research by considering many of the same factors that were examined in the earlier studies. Our focus is on understanding changes in Medicare SNF service availability and use between 1987 and 1989 and contrasting them with those observed between 1989 and 1991. We broaden the outcomes beyond those examined in past studies to include transitions in skill level/certification status, changes in Medicare bed supplies, changes in Medicare SNF stays per Medicare-certified bed, and changes in Medicare casemix.

The general structure is similar for each model with exceptions that will be noted. Explanatory variables reflect the facility's status as of the baseline year (1987 or 1989). All models include facility characteristics such as ownership, facility type, and number of beds. Analysis pertaining to Medicare facilities (such as the transition analysis for Medicare SNFs, changes in the number of certified beds, changes in Medicare stays per Medicare bed, and changes in Medicare casemix) also included variables that reflect the facility's fiscal intermediary for Medicare and whether the state has a Medicare maximization policy.

All models include state Medicaid policies regarding nursing home reimbursement levels and methodology. The transition and bed supply analyses also control for the degree of regulation governing nursing home bed supplies, while the transition models include ICF reimbursement levels. All models include a residential location indicator and variables that reflect the availability and demand for Medicare SNF services.

Findings from these analyses are presented in Tables 5.9 through 5.11. The results in these tables provide only signs (positive/negative) to indicate the directional relationship of characteristics to the likelihood of a particular outcome. Detailed model results and methods are presented in Appendix B.

Transitions Among Medicaid SNFs. As in the descriptive analysis, the sample is divided into three groups according to the skill/certification combination in the base year (1987 or 1989): (1) ICF only; (2) SNF with Medicaid (but no Medicare) beds; and (3) SNF with Medicare beds. The first two columns in Table 5.9 present results from transition models of SNFs that were certified originally only under Medicaid.[5]

Proprietary non-Medicare (i.e., Medicaid only) SNFs were more likely than their government-owned counterparts to become a Medicare SNF than to remain a Medicaid SNF in both time periods. Similarly, Medicaid SNFs with more nursing home beds were more likely than smaller facilities to become Medicare providers. The fact that these findings were consistent in both time periods suggests that proprietary nursing homes and those with more beds were not just responding to the MCCA provisions, but were increasingly becoming Medicare providers because of other forces. The greater specialization of nursing homes in rehabilitation and subacute care may be

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[5] Non-Medicare SNFs making transitions to ICFs were excluded from the analysis because they were so small in number.

Table 5.9: Transitions in Facility Categories and Medicare Beds: 1987-1989 and 1989-1991

Facility Characteristics	Medicaid to Medicare SNF		ICF to Medicaid SNF		ICF to Medicare SNF		Changes in Medicare Beds	
	1987-1989 (1)	1989-1991 (2)	1987-1989 (3)	1989-1991 (4)	1987-1989 (5)	1989-1991 (6)	1987-1989 (7)	1989-1991 (8)
Proprietary	+	+			+			-
Nonprofit								
Freestanding	+							
Both ICF & SNF Beds		-					+	+
Commercial Intermediary							+	-
Total Beds	+	+	+		+	+	+	
Medicaid SNF Rate	-	+	-		-	-		+
Medicaid ICF Rate	+			-	+	+		
Casemix	+			+		-	+	-
Retrospective	+	+		-		-	+	-
Medicare Max					+	+		+
Certificate of Need	-					+	+	
Urban Location	-				+			
Swing Beds/ Elderly							+	
SNF Beds/Elderly							-	
Hospital Discharge per SNF Beds							+	-
Change in Hospital Discharge								

g:\liuk\6146-06\chapt-v\v-9.tbl May 26, 1995 coming into play in the 1989-1991 period, with greater response among the proprietary nursing homes and those that are larger.

During the 1987-1989 period, freestanding Medicaid SNFs were more likely than hospital-based SNFs to gain Medicare certification. Between 1989 and 1991, dual-level Medicaid SNFs were less likely than SNF-only Medicaid SNFs to become Medicare providers relative to remaining only a Medicaid provider. Since the effect was operating only in the 1987-1989 period, it may indicate that freestanding nursing homes may have been reacting to the opportunities presented by the MCCA. No other facility-specific differences emerged in the periods under study.

All of the state Medicaid policy variables had significant effects in the 1987-1989 period while two of the five were significant in the 1989-1991 period. The effects on transitions among Medicaid SNFs of higher Medicaid reimbursement in the earlier period varied for SNF and ICF care. Medicaid SNFs were more likely to gain Medicare certification in states where Medicaid SNF reimbursement rates were lower and where Medicaid ICF rates were higher. This suggests that Medicaid SNFs getting lower Medicaid reimbursement for SNF care may have sought Medicare certification for their beds so that they could obtain potentially higher Medicare payments for patients who were otherwise paid as Medicaid patients. Higher Medicaid ICF rates had the opposite effects: non-Medicare SNFs were more likely to become Medicare SNFs between 1987 and 1989 in states where Medicaid reimbursed ICF care at higher rates than in the baseline year.

In the 1989-1991 period, only the Medicaid SNF rate had a significant coefficient. The sign was positive, the reverse of what it had been in the 1987-1989 period. After repeal of the MCCA, it was the Medicaid SNFs in states with higher Medicaid SNF rates that were more likely to gain Medicare certification. This could mean that nursing homes in states with more generous Medicaid SNF reimbursement are generally in a better position to gain Medicare certification relative to other nursing homes, but that the MCCA provisions induced certification in states with low Medicaid SNF reimbursement because of greater gains from converting a bed from Medicaid SNF use to Medicare use.

Medicaid SNFs in states with casemix-adjusted rates and a retrospective cost-based reimbursement method were more likely to become Medicare-certified between 1987 and 1989 relative to nursing homes in other states. A positive effect on the transition probability was also found for nursing homes in states with a retrospective payment method between 1989 and 1991. The relationship between Medicare payment and Medicaid reimbursement policies may explain these findings. Average costs are likely to be higher for nursing homes in states where Medicaid uses a casemix adjustment and reimburses on a retrospective basis, which in turn should raise the reimbursement level received from Medicare, making Medicare patients relatively more attractive.

Transitions Among Medicaid ICFs. There were many fewer transitions to Medicare SNF status among ICFs than among Medicaid SNFs. Only 5 percent of the ICFs gained Medicare beds in each two-year period. Almost all ICFs in our sample in 1987 remained ICFs in 1989. Only 2 percent became Medicaid SNFs in 1989, while 93 percent remained an ICF. Between 1989 and 1991, however, 81 percent became Medicaid SNFs. Columns 3 and 4 in Table 5.9 show the results for transitions to Medicaid SNF status by ICFs. Since our focus is on Medicare SNF availability and service provision, we summarize these findings only briefly. In the 1987-1989 period, only the facility's number of beds and the state's Medicaid SNF reimbursement rate had significant effects. In the 1989-1991 period, the state's ICF reimbursement rate and payment method had significant effects, as did the presence of Medicare beds in the area.

Columns 5 and 6 in Table 5.9 present results on transitions by ICFs to Medicare SNF status. As with the Medicaid SNFs, ICFs that were proprietary or had more beds were more likely to become Medicare SNFs than to remain ICFs relative to government-owned or smaller ICFs in the 1987 to 1989 period. Proprietary ICFs may have been more aggressive than other ICFs in taking advantage of the opportunities presented by the MCCA, because they were more sensitive to the greater profit potential.

In both periods, ICFs were less likely to become a Medicare SNF in states where Medicaid reimbursed SNF care at a higher level. The negative sign found in the 1987-1989 period is consistent with that found for non-Medicare SNFs at the same time. It suggests that non-Medicare facilities were more likely to develop the capability of serving Medicare patients where Medicaid SNF reimbursement was lower, possibly in response to the MCCA provisions that made Medicare provision more attractive. The negative relationship found for the Medicaid SNF rate in the 1989-1991 period suggests, however, that ICFs that needed to convert to a higher skill level to meet the OBRA 1987 requirements chose Medicare certification because Medicaid did not reimburse SNF care as generously.

We found that ICFs were less likely to convert to Medicare SNFs between 1989 and 1991 when they operated in states with casemix-adjustments or in states that paid on a retrospective basis. These signs run counter to what we found in the non-Medicare SNF models and it is not clear why these policies would have reverse effects for these two different types of facilities.

As expected, ICFs in states with mandatory Medicare certification of SNF beds were more likely to become a Medicare SNF than to remain an ICF, other things equal. These policies seem to provide an additional incentive for ICFs to certify SNF beds for Medicare rather than to remain an ICF.

Changes in Medicare Beds. Below we describe a model of the changes in the supply of Medicare beds between the baseline and follow-up years, focusing on factors influencing decisions to increase or decrease the supply of Medicare beds. As in the earlier analysis, the sample is restricted to those facilities with Medicare beds in both the baseline and follow-up years. The correlates of changes in Medicare bed supplies for Medicare facilities are presented in columns 7 and 8 of Table 5.9.

In the 1987-1989 period, facilities were more than twice as likely to increase bed supplies as to decrease them. In the 1989-1991 period, Medicare facilities were only slightly more likely to increase their bed supplies as to decrease them. The multivariate analysis indicates that dually certified Medicare facilities were more likely to increase than to decrease the number of beds certified for Medicare in both periods relative to SNF-only Medicare facilities. It could be that the SNF-only Medicare facilities already have a large share of beds certified for Medicare, and thus have less scope for converting beds to Medicare status. The dual-level Medicare facilities were already converting many of their ICF beds to a SNF level to meet the OBRA 1987 requirements in this period, thus creating more potential for Medicare beds.

We find that, between 1989 and 1991, proprietary Medicare facilities had lower propensities to increase the number of beds certified for Medicare relative to government-owned Medicare facilities. It is not clear why this would be happening except that proprietaries may have had less scope for increasing Medicare bed supplies relative to other facilities because their bed supplies were already dominated by Medicare. Medicare facilities that had a commercial insurer intermediary had higher propensities to add Medicare beds relative to other facilities in the 1987-1989 period, but had lower propensities to add beds in the 1989-1991 period. The chain facilities may have moved more quickly into Medicare in the early period to try to take advantage of the opportunities presented by the MCCA. The reverse effect found in the 1989-1991 period may reflect a post-MCCA readjustment among these same facilities.

Medicare facilities in states with more generous Medicaid SNF had greater propensities to add Medicare-certified beds relative to facilities in other states in the 1989-1991 period. This finding is consistent with that found for transitions to Medicare status among non-Medicare SNFs. It suggests that there may have been some complimentarity between Medicaid and Medicare SNF provision.

The effects of Medicaid's reimbursement method for SNF care varies between the two time periods. For 1987-1989, Medicare SNFs in states with casemix-adjusted reimbursement or retrospective payment had higher propensities to increase the number of beds certified for Medicare. The reverse was true for the 1989-1991 period. The 1987-1989 findings are consistent with those presented on transitions to Medicare certification among non-Medicare SNFs in the same period. However, the 1989-1991 results are different and suggest that Medicare SNFs in states with retrospective or casemix-adjusted reimbursement systems may have increased their certified bed levels in response to the MCCA. Once it was repealed, they might have reduced their certified bed levels or at least failed to increase them by as much as facilities facing different Medicaid payment systems.

We observe higher propensities to add Medicare beds in the 1989-1991 period among Medicare facilities in states that have Medicare maximization policies, in which all Medicaid SNF beds are required to be certified for Medicare. It could be that Medicare SNFs with ICF beds were having such beds certified for Medicare in states with mandatory Medicare certification of SNF beds. This finding is consistent with that emerging in the models on ICF transitions.

Several area-level factors have significant effects in these models. Consistent with expectations in the 1987-1989 period, propensities to add Medicare beds were lower in areas with more Medicare SNF beds per elderly, and higher where there were more hospital discharges per

Medicare-certified bed. This indicates that there was a greater propensity for expansion in Medicare bed supplies in areas where supply of Medicare SNF services was low and where the potential demand for them was high. The negative relationship between Medicare hospital discharges per Medicare SNF bed and the propensity to increase Medicare bed levels in the 1989-1991 period indicates that there may have been a readjustment related to the repeal of the MCCA. Contrary to expectation, facilities had a higher propensity to add Medicare beds in areas with more swing beds per elderly in the 1987-1989 period.

Changes in Medicare SNF Utilization. The provision of Medicare SNF services is defined here as utilization per Medicare-certified beds. Utilization is measured by the number of days per Medicare bed, number of stays per bed, and number of days per stay (length of stay, LOS). This construct controls for the variation across nursing homes in number of beds certified for Medicare. It also provides an extension to the analysis of changes in the Medicare SNF bed capacity discussed in the preceding section.

Table 5.10 presents results on significant relationships between characteristics and changes in Medicare SNF utilization between 1987 and 1989 and between 1989 and 1991. For each time period, results are presented on changes in total covered days per bed, as well as the two components of total covered days--admissions per bed and length of covered stay (LOS). Hence, results in Table 5.10 show changes in total covered days by facility characteristics, and the extent to which such changes in total days were due to changes in admissions or LOS. The 1987-1989 changes, presented in the lefthand panel, reflect a period when utilization increased as a result of the implementation of MCCA provisions and new coverage guidelines. The second panel presents results on changes between 1989 and 1991, a period when there was a general decline in Medicare-covered days, at least partially due to the repeal of the MCCA provisions.

Table 5.10: Changes in Medicare: Covered Days, Stays, and LOS: 1987-1989 and 1989-1991

Facility Characteristics	1987-1989			1989-1991		
	Days	Stays	LOS	Days	Stays	LOS
Proprietary	+	+		+	+	
Nonprofit		+	-	+	+	
Freestanding	+	+	+	-		-
Both ICF & SNF beds		-	+	-	-	
Blue Cross/Blue Shield	-	-		-		-
Total Beds						
Medicaid SNF rate	-	-	-		-	+
Medicaid ICF rate						
Casemix	+	+	+	+	+	
Retrospective	-	-(.09)	-	+	+	
Medicare max	-(.09)		-	-	-	
Certificate of Need						
Urban Location			-	+		
Swing Beds/ Elderly				-	-	-
SNF Beds/Elderly	+	+	+			
Hospital Discharge per SNF Beds	+	+		+	+	
Change in Hospital Discharge	+	+		+	+	-

Differences in utilization changes were found by type of ownership. Between 1987 and 1989, the increase in total covered days per bed of proprietary facilities was greater than that of government homes, the reference category. The sign for days per bed was positive, indicating that proprietary SNFs had a greater increase in covered days per bed than did government homes. This result suggests that proprietary SNFs responded more aggressively to the MCCA provisions than did government-owned homes. This difference in days was due principally to a greater increase in admissions per bed of proprietary facilities, rather than to any differential changes in LOS. This explanation is apparent because of the significant coefficient for admissions per bed, and the insignificant one for LOS.[6]

Unlike proprietary facilities, nonprofit SNFs did not increase use more than government homes. The absence of a significant differential change in total covered days between nonprofit and government SNFs was attributable to a smaller increase in LOS of nonprofit facilities, which offset their greater increase in admissions per bed.

In the 1989-1991 period, both the proprietary and the nonprofit ownership variables had positive coefficients. Because of the general decline in Medicare-covered days in this period, the positive coefficients imply that, relative to government homes, proprietary and nonprofit homes had smaller declines in Medicare-covered days. The declines by proprietary and nonprofit SNFs were less than that of government facilities largely because admissions per bed in government facilities declined more than those of proprietary and nonprofit homes.

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[6] Because of the interrelated construct of the three utilization measures, the coefficients also provide a basis for determining the proportions of growth differences in covered days that are attributable to admissions versus LOS. The greater net growth in days of proprietary nursing homes, relative to government homes, for example, was due to a 38 percent (0.38) greater increase in admissions per bed and a minus 2 percent (-0.023) growth in LOS.

Significant differences in Medicare SNF utilization were also found between freestanding and hospital-based SNFs. Between 1987 and 1989, freestanding SNFs had a greater increase in Medicare-covered days than did hospital-based SNFs, and this difference was due to larger increases in both admissions per bed and LOS. The greater increase in admissions of the freestanding facilities might have been due, in part, to their lower levels of Medicare SNF use in the base year of 1987 (Liu and Kenney, 1993). The greater increase in LOS of freestanding SNFs may have been due, in part, to the transfer of Medicaid residents in those nursing homes to Medicare-covered status. Such residents might have had longer than average Medicare-covered stays because they tended to be chronically disabled. Moreover, with the relatively generous Medicare copayment requirements under the MCCA, both freestanding SNFs and their residents had incentives to maintain Medicare coverage as long as possible.

In contrast to the 1987-89 period, the negative coefficient for freestanding SNFs indicates that their Medicare participation dropped more between 1989 and 1991 than did that of hospital-based SNFs. The greater relative decline in covered days of freestanding SNFs was due largely to relative declines in LOS rather than admissions per bed. This result is consistent with the expectation that, with the reinstatement in 1990 of the prior hospitalization requirement for Medicare SNF coverage, freestanding SNFs were no longer able to transfer existing Medicaid residents to Medicare coverage.

SNFs with commercial insurers for fiscal intermediaries, in contrast to SNFs with Blue Cross/Blue Shield as the fiscal intermediary, had larger increases in total Medicare-covered days in the 1987-1989 period, and smaller declines in the 1989-1991 period. These results were due to increases in admissions between 1987 and 1989 and to smaller decreases in LOS between 1989 and 1991. The 1987-1989 results seem to be consistent with the notion that SNFs with commercial insurers for fiscal intermediaries (i.e., those more likely to be affiliated with chains) tend to respond more aggressively to MCCA policy incentives than do non-affiliated nursing homes. The relatively small decline in LOS in the 1989-1991 period is consistent with the possibility that chain-affiliated nursing homes began to move more aggressively in the direction of providing "subacute" care for patients who required extensive rehabilitation services. Such change would be reflected by relatively longer Medicare-covered stays.

Medicaid nursing home reimbursement policies were also associated with changes in Medicare SNF utilization in both the 1987-1989 and 1989-1991 periods. Between 1987 and 1989, the Medicaid SNF payment rate was negatively associated with increases in Medicare-covered days, and affected both admissions and LOS. In contrast, between 1989 and 1991, the SNF rate was not significantly associated with total covered days, but had offsetting effects on admissions and LOS. The results for the 1987-1989 period suggest that despite the possibility that higher Medicaid rates tend to make average costs of SNFs closer to the cost of Medicare patients--thereby providing incentives for SNFs in high rate states to take Medicare patients--higher Medicaid rates also present SNFs with higher opportunity costs when they take a Medicare patient over a Medicaid patient. The positive relationship between the SNF rate and LOS in the 1989-1991 period suggests, on the other hand, that SNFs were more oriented toward providing subacute care in the latter period, and that provision of care to rehabilitation patients would be more likely where average facility costs were higher.

In contrast to the negative effects of Medicaid SNF rates, casemix adjustments for Medicaid payment had a positive effect on Medicare participation in both periods. Between 1987 and 1989, SNFs in states with casemix payment adjustments had greater increases in Medicare-covered days, as a result of greater increases in both admissions and LOS. Between 1989 and 1991, SNFs in such states had smaller declines in Medicare-covered days, largely because of smaller declines in admissions. The positive effects of casemix adjustment on utilization is consistent with the expectation that where states provided payment incentives for SNFs to take heavier care Medicaid patients, SNFs were also more predisposed toward serving Medicare patients.

The effects of retrospective in contrast to prospective payment on Medicare SNF utilization differed between the 1987-1989 and the 1989-1991 periods. Although, between 1987 and 1989, it had a negative effect on increases in total covered days, admissions, and LOS, retrospective payment had a positive effect on covered days and admissions between 1989 and 1991. Our expectation was that retrospective payment would have a positive effect on Medicare participation because retrospective payment systems are based on facility costs, and therefore tend to be more generous than prospective payment systems. While this argument cannot explain the 1987-1989 period changes, it might apply to the 1989-1991 period.

Although the number of swing beds per elderly in the area was not significantly related to any of the SNF utilization variables in the 1987-1989 period, it was negatively associated with changes in all three utilization measures between 1989 and 1991. We had hypothesized that SNFs and swing bed hospitals in the same area would be in competition for Medicare SNF patients. The lack of association in the 1987-1989 period indicates that availability of swing beds did not affect SNFs when Medicare-covered days were increasing. In the 1989-1991 period, however, the decline in utilization was greater for SNFs in areas with more swing beds per elderly person. One possibility is that competition between swing bed hospitals and SNFs is only apparent at some threshold level of demand that was not met in the earlier period but was met in the latter period.

We found that change in Medicare utilization was positively associated with Medicare SNF beds per elderly in the 1987-1989 period but not in the 1989-1991 period. The significant increases in total covered days, admissions, and LOS between 1987 and 1989 were opposite from our prior expectation that more beds would result in greater competition among SNFs and, consequently, slower facility-specific growth. Finally, increases in total covered days per bed was positively associated with hospital discharges per Medicare bed and with changes in hospital discharge per bed in both the 1987-1989 and 1989-1991 periods. These results might be expected because the primary source of Medicare SNF patients was hospital discharges.

Changes in Casemix. The results of models estimating changes in casemix between the 1987-1989 and 1989-1991 periods are presented in Table 5.11. Although no difference in casemix changes were detected between freestanding and hospital-based SNFs in the 1987-1989 period, freestanding SNFs had a greater increase in Medicare casemix between 1989 and 1991. This finding is consistent with the suggestion that freestanding SNFs began to be more actively involved in providing subacute care during this period. Casemix changes of multilevel SNFs, relative to facilities with only SNF beds, differed for the two periods. Between 1987 and 1989, multilevel SNFs had smaller increases in casemix than did facilities with only SNF beds, a result that might be expected in light of the generally lower skilled staffing of multilevel facilities. Between 1989 and 1991, multilevel SNFs had greater increases in casemix than SNF-only facilities. This result might be due to the previously low casemix levels of multilevel SNFs. The greater change in casemix may have also been associated with the effects of OBRA 1987 requirements, which effectively forced all ICFs to upgrade their staffing levels to those of SNFs. Hence, greater casemix increases of the SNF/ICFs might have been a reflection of their generally improved skilled staffing levels relative to facilities with only SNF beds whose staffing levels were not to be affected by OBRA 1987 requirements.

Table 5.11: Changes in the Medicare SNF Casemix Index: 1987-1989 and 1989-1991

Facility Characteristics	1987-1989	1989-1991
Proprietary		
Nonprofit		
Freestanding		+
Both ICF & SNF beds	-	+
Blue Cross/Blue Shield	+	-
Total Beds		-
Medicaid SNF rate	-	-
Medicaid ICF rate		
Casemix		
Retrospective		
Medicare max		
Certificate of Need		
Urban Location		+(.10)
Swing Beds/ Elderly		
SNF Beds/Elderly	-	
Hospital Discharge per SNF Beds	+	-
Change in Hospital Discharge		

Between 1987 and 1989, facilities with commercial insurer fiscal intermediaries had a smaller increase in casemix than did their counterparts with Blue Cross/Blue Shield for intermediaries. We speculate that SNFs that belonged to chains with such insurers (presumably large national chains) were more active in obtaining Medicare coverage for their Medicaid residents in light of the elimination of the three-day prior hospitalization requirement. Between 1989 and 1991, SNFs with commercial insurer intermediaries had larger increases in casemix than did facilities with Blue Cross/Blue Shield intermediaries. This finding is consistent with our expectation that chain nursing homes were moving more actively toward serving skilled nursing and rehabilitation patients during this period.

A negative association was found between Medicare casemix and Medicaid SNF payment rate for both the 1987-1989 and 1989-1991 periods. This finding is consistent with other results discussed above, suggesting that facilities receiving relatively high Medicaid payment can be more selective about their participation in Medicare. This finding also suggests that, in states with generous Medicaid payment, SNFs may be not only more selective about taking Medicare patients in general, but also more selective about admitting relatively lighter care Medicare patients.

Between 1989 and 1991, SNFs in urban areas tended to have greater increases in casemix than SNFs in rural areas. This finding might be a reflection of the greater supply of professional therapists in urban areas, thereby allowing SNFs to advance more readily into the subacute care market. Moreover, institutionally based rehabilitation services could result in higher reimbursement than received under Part B by independent practitioners. Finally, SNFs in areas with higher numbers of hospital discharges per SNF bed had larger increases in casemix severity between 1987 and 1989, but smaller increases between 1989 and 1991. It is possible that the positive coefficient for the 1987-1989 might be associated with the greater likelihood of SNF patients being admitted from hospitals in high discharge areas in contrast to the transfer of Medicaid nursing home residents to Medicare coverage in low hospital discharge areas. The results for the 1989-1991 period are equally difficult to interpret, but may be associated with the possibility that greater demand for SNF care, reflected by higher hospital discharges, may actually have had a diluting effect on casemix severity.

VI. SUMMARY AND DISCUSSION

The period of time covered by this study, 1987-1991, witnessed major changes in Medicare SNF services. Prior to 1987, Medicare SNF expenditures typically accounted for about 2 percent of total annual expenditures for nursing home care. By 1991, Medicare's SNF expenditures accounted for 4.5 percent of total nursing home expenditures, and the proportion has continued to rise with time. In 1993, for example, the over $5 billion paid out by Medicare for SNF care accounted for 8 percent of nursing home expenditures. This rise corresponds to an increase in Medicare SNF covered days from 7 million in 1987 to 31 million in 1993

The changes in expenditures over this period reflected changes in nursing home policies. New coverage guidelines for Medicare SNFs, issued in April 1988, made coverage determinations more explicit and less subjective, having a positive effect on Medicare SNF admissions. The MCCA contained provisions that reduced copayment amounts, extended the number of allowable days of coverage, and eliminated the prior hospitalization requirement. The provisions affected positively both admissions and covered days per stay in 1989, the year in which they were in effect. Moreover, the generosity of the combined policy changes in the MCCA also appeared to have increased nursing home participation in the Medicare SNF program, as reflected by increases in the number of facilities obtaining Medicare certification between 1987 and 1989. Finally, OBRA 1987 requirements that Medicaid ICFs meet the staffing levels of SNFs by 1990 also increased the likelihood that more nursing homes would provide Medicare SNF care.

Although program statistics have documented national utilization and payment increases for the SNF benefit, the aim of this study was to provide a better understanding of differential changes in participation and utilization between 1987 and 1991 across nursing homes. Because of the particularly strong incentives for increased provision of Medicare SNF services embodied in the MCCA provisions, we examined changes between 1987 and 1989--to detect responses to the implementation of the MCCA provisions and new coverage guidelines--and between 1989 and 1991--to assess which nursing homes might have had differential responses to the repeal of the MCCA provisions.

In this study, we examined changes in numerous measures reflecting participation and utilization of the Medicare SNF program. Changes in facility-level certification from non-Medicare SNF or ICF to Medicare SNF, and changes in Medicare-certified services were analyzed to determine how subgroups of nursing homes increased or decreased their capacity to provide Medicare SNF services. We analyzed changes in covered days per bed, admissions per bed, length of stay, and Medicare casemix to determine how facilities that were certified to provide Medicare SNF services differed in their provision of such services and in the casemix severity of their Medicare patients over the years under study.

In general, we found large increases in the participation of nursing homes in the SNF program and in the utilization of Medicare SNF days between 1987 and 1989. The 1989 level of utilization, in terms of covered days per enrollee, approximated that of the 1969 level. The historical changes in utilization of the Medicare SNF benefit clearly reflect the administrative policies, such as coverage guidelines, that govern the Extended Care Benefit in SNFs.

As an example, the magnitude of the recent changes strongly suggests that the MCCA, along with the clarification of coverage guidelines, had an impact on the SNF benefit during this time period. Although we cannot estimate the precise effect of each policy, we think that the multiple provisions of the MCCA were responsible for a greater share of the growth in utilization between 1987 and 1989. The decline in Medicare SNF days between 1989 and 1991, reflecting the repeal of the MCCA SNF provisions, supports the effect of MCCA on Medicare SNF use in 1989. The fact that utilization did not return to pre-MCCA levels, however, suggests that the maturation of response to the coverage guideline clarification contributed to the growth of the Medicare SNF benefit. In addition, we think that OBRA 1987 requirements and an orientation of many nursing homes toward the provision of rehabilitation and other subacute care services contributed to participation and utilization trends that have emerged since the repeal of the MCCA. Below we highlight major findings from our analysis.

Findings from the Descriptive Analysis

Between 1987 and 1991, the number of Medicare SNFs grew by 21 percent while the number of certified beds grew by 15 percent. We found that 24 percent of Medicaid-only SNFs in 1987 became Medicare-certified by 1989, while 30 percent of Medicaid-only SNFs in 1989 became certified for Medicare by 1991. Thus, the rate of growth of facilities opting to participate in the Medicare SNF program continued at the same or even higher rate even after the repeal of the MCCA SNF provisions. We also found that the growth rate of Medicare-certified beds was twice as high in the post-MCCA period as it was in the 1987-1989 period. These results are consistent with the notion that factors other than the MCCA incentives were contributing to the participation of nursing homes in the Medicare SNF program.

Using the MEDPAR SNF file to examine utilization, we found that between 1987 and 1992, covered days increased by 247 percent. The greatest number of covered days occurred in 1989. This increase, to more than twice the number of covered days in 1988, appears to be a result of the MCCA. Other changes in utilization mimicked the increase in covered days. Admissions increased 176 percent and length of stay increased by roughly six days over the study period, with both peaking in 1989.

The number of Medicare SNF admissions increased between 1987 and 1989, declined between 1989 and 1990, and then began to increase again. By 1992, the number of Medicare SNF admissions was higher than in 1989, when the MCCA provisions were in effect. Between 1987 and 1992, freestanding SNFs increased their proportion of Medicare SNF-covered days; by 1992 they accounted for four-fifths of total covered days.

We found that more than three-quarters of the increase in Medicare-covered days was attributable to increased use of beds (i.e., stays per bed) and that less than one-quarter of the increase was attributable to increases in the number of Medicare-certified beds. Despite the increased use of available Medicare SNF beds, we found that the use of that capacity was only 9 percent in 1991, even though it had doubled from 4 percent in 1987.

The MEDPAR casemix analysis indicated that the increasing casemix severity of Medicare SNF patients was not affected by the MCCA SNF provisions. Casemix severity of Medicare SNF patients did not change between 1987 and 1989, but increased between 1989 and 1991. The increase in casemix severity in the latter period was associated with an increasing proportion of SNF patients receiving extensive rehabilitation services. This finding is consistent with the new orientation of many SNFs toward the provision of rehabilitation and other subacute care since 1990.

Our analysis of changes in staffing focused on registered nurses per bed. We found virtually no change in this indicator of staffing between 1987 and 1989, but very large increases between 1989 and 1991 among nursing homes that were providing either multilevel (SNF/ICF) or ICF-level care. The doubling of this staffing indicator suggests that ICFs were responding to the OBRA 1987 staffing requirement that all former ICFs had to meet SNF staffing standards by 1990.

Descriptive data also indicated continuing potential for a Medicare SNF access problem. Several states had low percentages of Medicare-certified SNFs and low rates of Medicare-certified beds relative to Medicare enrollees. For example, Oklahoma was the only state with less than 10 percent Medicare-certified SNFs and less than 10 percent of beds certified for Medicare in 1991. There were fewer than six certified beds for every 1,000 Oklahoma Medicare-enrollees in 1991. Similarly, in Iowa only 14 percent of certified nursing homes were certified for Medicare in 1991. Moreover, we found that the largest part of Medicare-covered days were handled by a small number of facilities. In 1987, 11 percent of all SNFs handled roughly half of all Medicare-covered days. By 1992, 15 percent of SNFs accounted for almost half of covered days. The last 8 percent of covered days in 1992 was spread across 62 percent of facilities.

Findings from the Multivariate Analysis

Ownership. Ownership is a facility characteristic that has been found in prior research to differentiate homes in terms of Medicare SNF participation. Consistent with expectation, proprietary nursing homes were apparently more responsive than government homes to the incentives embodied in the policy changes. Between 1987 and 1989, proprietary homes, both SNFs and ICFs, that were not certified to provide Medicare SNF services in 1987 were more likely than government homes to become Medicare-certified, other things equal. In addition, proprietary homes had greater increases in Medicare SNF utilization in both time periods studied. The findings suggest a greater predisposition on the part of proprietary homes toward increased participation in Medicare's Extended Care Benefit, by responding more aggressively to the MCCA provisions in the 1987-1989 period and by moving toward providing rehabilitation services in the 1989-1991 period. In contrast to proprietary facilities, we found relatively few differences between nonprofit and government homes in Medicare SNF provision, the only exception being a greater increase in utilization among nonprofits in the 1989-1991 period.

Proxy Chain Indicator. Another dimension of ownership that we analyzed was the likelihood that a SNF belonged to a nursing home chain. Despite the imprecision of the measure (i.e., fiscal intermediary type), some of the findings appear to be consistent with our expectations about differential responses between chain-related and non-chain related nursing homes. The major differences in response by type of fiscal intermediary was in the utilization of Medicare SNF days. SNFs with commercial insurers for fiscal intermediaries had larger increases in covered days per bed in both the 1987-1989 and the 1989-1991 periods. To the extent that the indicator is a proxy for chain affiliation, nursing homes belonging to chains had greater increases in their participation in the Medicare SNF program compared to non-chain affiliated facilities. We think that those facilities were more responsive to the provisions of the MCCA in the earlier period and were moving more aggressively into the provision of subacute rehabilitation care in the period. A greater increase in casemix severity among chain-affiliated nursing homes in the 1989-1991 period was consistent with a new orientation toward providing subacute rehabilitation care.

Hospital-Based Versus Freestanding Status. Although we did not find any differences in certification changes between the hospital-based and freestanding nursing homes for either of the two periods examined, we did find differences in utilization changes between the two. In the 1987-1989 period, the freestanding SNFs had greater increases in covered days per bed, admissions per bed, and LOS than did hospital-based SNFs. In the subsequent period, 1989-1991, freestanding SNFs had greater declines in utilization than did hospital-based SNFs. Reflecting a strong response to the new coverage guidelines and the MCCA provisions, freestanding SNFs had an increase in covered days per bed that was 60 percent greater than that of hospital-based SNFs between 1987 and 1989. Some of this difference in growth was probably attributable to the transfer of Medicaid residents of freestanding SNFs to Medicare payment status. Given overall growth of nursing home patients in this period, Medicaid and private pay patients did not increase as much as might be expected. Thus, it appears that Medicare provided an alternative source of payment for patients who might otherwise have been Medicaid or private pay. Such transfers were much less likely to occur among hospital-based facilities because they do not generally provide long-term nursing home care. With the repeal of the MCCA provisions, Medicare SNF provision declined more among freestanding SNFs than among hospital-based SNFs, but the difference was only 14 percent, suggesting that much of the shift was permanent.

Medicaid Nursing Home Policies. Prior to 1988, nursing home participation in the Medicare SNF program strongly reflected the environment created by the Medicaid nursing home policies in each state. This is because Medicaid payments accounted for approximately half of nursing home revenues while Medicare payment accounted for only 2 percent. One Medicaid policy we examined was the average Medicaid reimbursement rate for SNFs. Our results indicate that the relationship between Medicaid SNF rate and Medicare SNF provision was generally negative in the early part of the period under study. For example, in the 1987-1989 period, the higher the Medicaid SNF rate, the less likely that non-Medicare participating SNFs or ICFs would convert to Medicare status. Likewise, where Medicaid SNF rates were higher, growth in Medicare utilization was lower. Finally, increases in casemix were smaller among participating SNFs in states with higher Medicaid reimbursement rates. In that period, higher Medicaid payments presented SNFs with higher opportunity costs when they accepted Medicare over Medicaid patients.

In the 1989-1991 period Medicaid SNF rates were positively associated with non-Medicare SNFs converting to Medicare-certified facilities and with increases in Medicare-certified beds. Although Medicaid SNF rates did not differentiate changes in Medicare utilization in that period, these rates continued to be negatively related to casemix severity. The apparent difference in the relationship between Medicaid SNF rates and participation of nursing homes in the Medicare SNF program between the two periods may reflect the MCCA factor. We think that as SNFs become more involved in providing subacute care, higher Medicaid reimbursement rates would provide a more favorable environment for SNFs to staff for heavier care patients in general, thereby enabling them to participate more actively in providing Medicare SNF services. We speculate that, by the end of our observation period, some changes might have started to occur in the relationship between Medicaid SNF rates and nursing home participation in Medicare.

Nursing homes in states that employed a casemix adjustment in setting their Medicaid nursing home payment were generally more likely than homes in other states to begin participating in Medicare and to have had greater growth in Medicare utilization. Casemix adjustment was positively associated with likelihood of non-Medicare SNFs converting to Medicare status and with increases in Medicare beds between 1987 and 1989. Greater increases in Medicare-covered days per bed were found among nursing homes in casemix states for both the 1987-1989 and the 1989-1991 periods.

Nursing homes in states with Medicare maximization policies requiring Medicaid SNFs also to be certified for Medicare were more likely than others to convert to Medicare, yet their provision of Medicare services tended to grow less than that of nursing homes in other states. Hence, such

Medicare maximization policies may not have strong effects on increasing access to Medicare SNF services.

Implications for Access

Historically, there have been concerns about the adequacy of access to the Medicare SNF benefit. Although covered days per 1,000 enrollees were 878 in 1969, at the outset of the Medicare program, administrative rules were applied which reduced utilization to under 400 covered days per 1,000 enrollees per year by 1991. The use of the Medicare SNF benefit remained fairly flat during the 1980's, a time when demand for SNF services was expected to rise because of the introduction of the hospital Prospective Payment System. In addition, the availability of Medicare-certified nursing home beds varied substantially across states as did the propensity to use the benefit. Explanations given for low Medicare SNF use included high costs of serving Medicare patients relative to payment levels, and inconsistencies and restrictiveness in coverage determination on the part of fiscal intermediaries. Moreover, state Medicaid nursing home policies were shown to affect staffing patterns within nursing homes and, thus, their readiness to serve Medicare patients.

The 1987-1991 period seemed to be one in which access to Medicare SNF care in a nursing home setting increased. The number of facilities and beds certified to provide Medicare services increased and the use of Medicare-certified beds also expanded. There were increases in the availability of Medicare SNF care, both in rural and urban areas. However, regional disparities in the availability of Medicare SNF beds remained, indicating that access problems may persist in some areas. Moreover, the use of Medicare-certified beds falls far short of their potential use, so that while many beds are certified for Medicare SNF care, they are actually used to provide very little Medicare-covered care.

Thus, our analysis points to mixed findings regarding access to Medicare SNF care. On the one hand, Medicare service provision expanded greatly even with the repeal of the MCCA. On the other hand, bed availability remains low in some areas. Expansions in access are a likely consequence of several factors. First, the coverage clarifications may have made nursing homes more willing to serve Medicare patients because of greater certainty regarding Medicare coverage policies. Second, the MCCA may have given nursing homes greater familiarity with Medicare, making them more disposed to provide Medicare services even after the provisions were no longer in effect. Third, increases in rehabilitation patients also suggest that nursing homes became more equipped to provide rehabilitation care, which was compatible with serving Medicare patients. Finally, OBRA 1987 led to increases in staff levels that also made it easier to serve Medicare patients.

Notwithstanding the factors that have favored expansion of Medicare SNF provision, it is not clear that Medicare's reimbursement policies provide sufficient incentives for nursing homes to meet the demand for Medicare SNF services. Other studies are needed to understand whether Medicare hospital patients have adequate access to Medicare SNF services, and what the consequences are of limiting Medicare SNF care to post-acute patients and retaining the high copayment amount.

Conclusion

Although the implementation of the MCCA provisions was associated with a jump in covered days and expenditures in 1989, repeal of the provisions resulted in a retrenchment in utilization and expenditures in 1990, but to a level that did not reflect pre-MCCA levels. Some changes such as length of stay (LOS) might have been more directly related to MCCA. For example, LOS increased in 1989 and retraced much of the gain to approximately the levels after repeal of MCCA in 1990. On the other hand, total covered days and expenditures declined after repeal of the MCCA, but soon began to grow rapidly again. For example, payments for the Medicare SNF benefit were estimated to be $2.8 billion in 1989 and rose to $5.7 billion in 1993.

In the context of recent statistics, it appears that the direct effects of the MCCA provisions on the Medicare SNF benefit were relatively small in terms of longer term trends. We think that the MCCA SNF rules provided an impetus for the acceleration of Medicare SNF provision by many facilities. Backdrop for greater participation in Medicare SNF provisions was also provided by the new coverage guidelines issued in 1988 and by OBRA 1987 requirements that went into effect in 1990. In light of the current trend of increasing Medicare SNF use and the increasing intensity of the casemix of Medicare patients, these latter policies may have enduring effects on Medicare SNF use. Although the nursing home industry is still dominated by Medicaid, the Medicare policy and industry changes that we studied have increased the Medicare share of nursing home care financed by Medicare.

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APPENDIX A

MEDPAR CASEMIX

Creating a MEDPAR Analog to the RUG-III Classification System

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As Medicare payments for post-acute institutional care continue to rise sharply, policy interest in the clinical characteristics of beneficiaries admitted to nursing homes and their variation across facilities has stimulated research into case mix. Measures of Medicare skilled nursing facility (SNF) case mix are important in relating payments to the care requirements of residents. The Resource Utilization Groups, Version III (RUG-III) classification system uses a new minimum data set that is not currently available nationally. In preparation for a multi-State demonstration, we needed to simulate at least the first-level splits at the national, State, and facility level. Therefore, we developed proxy measures using comparable data available on the National Claims History files. The analog is an easily programmed measure of the acuity/severity of beneficiaries' conditions across a Medicare Part A SNF stay in 75 percent of the SNF providers. This can be a method for estimating changes in case mix over the years, and differences across provider types and States.

INTRODUCTION

Policy interest in the clinical characteristics of nursing home residents and their variation across facilities has stimulated research resulting in an extensive body of knowledge about this group. Most of this prior research has focused on Medicaid nursing home residents; some nursing homes have been found to have more severe or complex caseloads, and therefore higher costs, than others. States sought ways to measure this complexity (called case mix) in order to reimburse nursing homes accordingly. In contrast, analysis of Medicare SNF residents has been limited, principally, to specialized studies involving relatively few nursing homes.

As demand for nursing home services increases, so does interest in reforming the payment system for the Medicare SNF benefit. Measures of Medicare SNF case mix are essential to relating payment to the care requirements of the residents, so that Medicare Part A payments to SNFs with different caseloads are distributed equitably. Two recent studies have offered advances in this area. The first is the development of RUG-III, a case-mix classification system designed to adequately capture the resource use of nursing home residents and provide an improved method of tracking the quality of their care (Fries et al., 1994). RUG-III was developed to serve as the basis for the Multistate Medicare/Medicaid Payment Indexes (M^{3}PI) used in the Nursing Home Case Mix and Quality (NHCMQ) demonstration project. The design phase of the demonstration included nursing homes in seven States. Unlike prior nursing home payment demonstrations, however, this study included case mix in the payment calculations for Medicare as well as Medicaid residents.

In the second study, HCFA and the Urban Institute applied the RUG-III classification system to data from the Medicare

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provider analysis and review (MEDPAR) data base. MEDPAR is an analytical file created from Medicare hospital and SNF claims and maintained by HCFA. These claims are the basis of the interim payments made by fiscal intermediaries. This file contains information on SNF stays paid for by Part A nationwide. Although Medicare claims information does not include all data necessary to classify SNF residents exactly as they are in RUG-III, it does contain sufficient information to assign Medicare SNF residents to RUG-III categories at the most general level. The value of the MEDPAR analog is that it provides a means to use nationally available data to examine the case mix of Medicare SNF residents.

The MEDPAR analog has come into increasingly wider use since its development. In connection with the NHCMQ demonstration, it has been used to examine the characteristics of nursing home residents, methods of payment, and the quality of resident care. It is also being used as a proxy case-mix measure by the Urban Institute to analyze trends in Medicare SNF use and costs. The purpose of this article is to document the development of the MEDPAR case-mix proxy and discuss its uses and limitations. The following sections describe the relationship between RUG-III and MEDPAR, present case-mix statistics from the 1992 MEDPAR SNF file, and discuss the implications and limitations of the proxy measure.[1]

BACKGROUND

SNF services are a Part A (hospital insurance) benefit under Medicare. The benefit is available only to patients who require continued skilled nursing care and/or skilled rehabilitation services on a daily basis following a hospital stay of at least 3 days. Medicare covers a maximum of 100 days in an SNF per episode of illness, defined by 60-day periods of health (in terms of an absence of Medicare institutional charges) before and after the period of illness. A daily copayment ($81.50 in 1992)[2] takes effect after 20 days of SNF care. For some facilities, this copayment is greater than the daily cost of SNF care, and many residents switch to alternate coverage after the 20th day, ending their Medicare-covered stay and therefore exiting the MEDPAR file. Thus, many stays that last more than 20 days appear truncated in the MEDPAR file, and stays that last more than 100 days are similarly limited in the MEDPAR file.

SNFs are currently reimbursed on the basis of reasonable cost, subject to limits on the per diem routine service costs of the facility. There are no case-mix adjustments to SNF payments. Routine costs include nursing, room and board, administrative costs, and other overhead. Capital-related and ancillary costs (including therapy and drugs) are excluded from the routine limit. Separate limits also apply to rural and urban SNFs. SNFs providing less than 1,500 days of care per year may opt to receive a prospectively set payment instead of cost-based reimbursement.

Different payment conditions apply to the three types of SNFs: hospital-based, freestanding, and swing-bed hospitals. Each type varies in number and in average length of stay (LOS) across States. Hospital-based SNFs are units under hospital governance. This arrangement allows hospitals to keep inpatient acute-care LOSs short by enabling them to use the SNF benefit for extended care. Freestanding SNFs are independent from hospitals, although they may have cooperative arrangements with local hospitals. They are the most prevalent type of SNF, and tend to be larger, handle more therapy cases, and have longer LOS than the other types of SNFs. A shortage of SNF beds in rural areas and low occupancy in rural hospitals led to the establishment of swing-bed hospitals, which can use the same beds for either SNF care or regular inpatient care. Swing beds tend to be oriented toward short-term recovery. If a patient requires additional care, he or she could be transferred to the hospital or to another nursing home, depending on his or her condition. The Medicare routine limit for freestanding facilities is 112 percent of the national average per diem cost for urban and rural facilities, respectively. The hospital-based limit is the freestanding limit plus one-half the difference between the freestanding rate and 112 percent of the average hospital-based per diem cost (also by urban or rural location). Swing-bed hospitals are paid a prospective per diem rate based on the regional average of freestanding SNFs in the same area. Ancillary and capital costs are paid on a reasonable cost basis for all three types of SNFs.[3]

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[1] SAS source codes and documentation are available upon request from the authors.

[2] The 1992 copayment is shown because data are from 1992. The copayment in 1994 was $87, and in 1995 it is $90 a day.

Among the services nursing home residents may receive are skilled rehabilitation therapy and nursing rehabilitation. To be eligible for Medicare coverage for skilled rehabilitation therapy under 1988 coverage criteria, a resident must receive skilled rehabilitation three times a week and nursing rehabilitation to maintain the benefits of the skilled therapy the other 4 days of the week. Skilled rehabilitation includes physical therapy (PT), occupational therapy (OT), and speech pathology (SP), alone or in any combination; nursing rehabilitation consists of providing active or passive range of motion, splint/brace assistance, and training in such activities as transferring, dressing/grooming, eating/swallowing, or locomotion/mobility.

PT, OT, and SP provided in the SNF are covered under Part A, unless they are provided by an independent agency, in which case they may be billed under Part B. In addition, not all facilities detail therapy charges in their claims (which comprise MEDPAR). Given these constraints and the coverage limits previously discussed, it should be noted that the MEDPAR proxy is not a complete record of all the therapy a SNF resident may receive during the course of his or her illness.

DESCRIPTION

RUG-III Classification System

As previously noted, RUG-III was developed as part of the multi-State NHCMQ demonstration design, a 5-year effort sponsored in 1989 by HCFA. The purpose of the demonstration is to implement and evaluate Medicare and Medicaid payment procedures and quality monitoring systems for nursing home services using RUG-III across several States. The final RUG-III briefing document was completed in March 1992, after being critiqued by analysts from the demonstration States, five clinical workgroups, and a technical expert panel.[4]

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[3] In this context, ancillary services refers to social work, therapy services, and transportation.

[4] The clinical nursing workgroup found that the RUG-III system did not progress consistently from low to high in terms of staff time as one advanced through the hierarchy. Nursing staff times were adjusted using clinical judgments about level of effort (or nursing resource) for three types of nursing staff to bring the classes into a strictly ascending order. The combined adjustments added less than 1 minute per resident of licensed nursing time and 1.1 minutes of nursing assistant time. These adjustments resulted in the M^3PI.

RUG-III is a 44-group model[5] for classifying nursing home residents into homogenous groups according to common health characteristics and the amount and type of resources they use. RUG-III serves as the basis of the M^{3}PI, used to determine nursing home case mix. The purpose of the index is to establish equitable prospective payment levels for residents with different service use. Companion quality indicators are being developed to monitor the quality of the process and the outcomes of care. Case mix in the nursing home context is not based on diagnosis-related groups (DRGs) as it is for acute-care facilities. DRGs are based on LOS and episode cost. Nursing home stays are too variable in duration, and so nursing home case mix is linked instead to daily resource use in terms of staff time and services provided.

The classification system was designed using resident characteristics (specifically, a survey called the Resident Status Measure [RSM]) and wage-weighted staff time (STM). The RSM evolved into a refined instrument called the Minimum Data Set (MDS), used in nursing homes across the Nation to assess resident functional status and to develop plans of care. From the RSM and the MDS came a third assessment tool, the Minimum Data Set Plus (MDS+), which is used in the demonstration States (Feldman and Boulter, 1991). The STM measured the staff time required to care for groups of residents—over a 24-hour period for nursing staff and over the span of a week for ancillary services.

RSM/STM data were collected for 7,648 residents in 202 nursing homes in Kansas, Maine, Mississippi, South Dakota, Nebraska, Texas, and New York from March to December 1990. Analysis identified three main predictors of a resident's resource utilization: (1) clinical characteristics; (2) self-performance in ADLs;[6] and (3) counts of services received. The RUG-III classification system uses these three variables to describe nursing home residents for the purposes of determining case mix. Table 1 shows the mutually exclusive, layered categories of the RUG-III classification system. The table describes a resident's clinical characteristics, the levels of assistance used in performing ADLs, and the counts of services a resident receives. Clinical characteristics include the residents' diagnoses, conditions, and comorbidities. ADLs include bed mobility, toilet use, transfer from bed to chair, and eating. Residents receive a single RUG-III ADL index score which measures the resident's performance of these activities (scores range from 4-18; higher scores represent greater assistance used). Finally, counts of services include the number of nursing rehabilitation services (previously described), extensive treatments (i.e., suctioning or parenteral feeding), or indications of depression.

The first level of the RUG-III system is a hierarchy of major resident types, representing groups of residents with certain clinical conditions. These include Rehabilitation, Extensive Services, Special Care, Clinically Complex, Impaired Cognition, Behavior Problems, and Reduced Physical Function. For example, the Special Care category includes residents with burns, coma, quadriplegia, multiple sclerosis, pressure ulcers, fever with vomiting, weight loss,

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[5] Although Medicare will use the 44-group RUG-III system exclusively in the demonstration, some States have chosen to continue paying for therapy under Medicaid on a fee-for-service basis. These States were encouraged to collapse the rehabilitation intensity groups into one category with a three-level activity of daily living (ADL) split in order to better allocate funds across the State-specific Medicaid population. Thus, Mississippi and South Dakota use an alternative Medicaid classification system with 35 groups.

[6] Note that there is a difference between the ability to perform an ADL and actual self-performance of the ADL. Residents may have the capability but not the will to perform ADLs on their own.

Table 1
Description of RUG-III Classification Branches

Hierarchy Category	Activities of Daily Living	Problem/Service Split
Rehabilitation		
Very High Intensity	3 Levels	—
High Intensity	4 Levels	—
Medium Intensity	3 Levels	—
Low Intensity	2 Levels	—
Extensive Services	—	Count of Services
Special Care	3 Levels	—
Clinically Complex	4 Levels	Signs of Depression
Impaired Cognition	2 Levels	Nursing Rehabilitation (Activity Count)
Behavior Problems	2 Levels	Nursing Rehabilitation (Activity Count)
Reduced Physical Function	5 Levels	Nursing Rehabilitation (Activity Count)

NOTE: RUG-III is Resource Utilization Groups, Version III.

SOURCE: Fries, B.E.: Multistate Nursing Home Case Mix and Quality Demonstration: Description of the Resource Utilization Group, Version III (RUG-III) System. Unpublished. March 20, 1992.

pneumonia, or dehydration, and residents receiving radiation treatments. The Clinically Complex group consists of residents requiring care for cerebral palsy, hemiplegia, chemotherapy, wounds, kidney failure, urinary tract infections, aphasia, and transfusions. Residents showing behavioral symptoms such as wandering, hallucinations, or physical or verbal abuse of others are classified in the Behavior Problems category, unless the presence of another condition places them in a higher category. In addition to having certain diagnoses, residents in each category must have a minimum ADL score. Extensive and Special Care residents must have a minimum ADL score of 7, whereas Behavior Problem residents cannot have ADL scores above 10.

Rehabilitation, involving the most severe conditions, the most intensive need for services, and thus the greatest expenditure of money and time, appears at the top of the hierarchy. Residents requiring Rehabilitation services are divided into four levels of intensity. Intensity is described in the RUG-III system using total minutes of therapy per week, days of therapy per week, and the number of types of therapy received. The divisions are as follows:

- Very High Intensity Rehabilitation—at least 450 minutes of skilled therapy per week, at least 5 days per week of one type of therapy, and at least two of the three types of therapy provided.
- High Intensity Rehabilitation—at least 300 minutes of skilled therapy per week, and at least 5 days per week of one type of therapy.
- Medium Intensity Rehabilitation—at least 150 minutes of skilled therapy per week, and at least 5 days per week of one type of therapy.
- Low Intensity Rehabilitation—at least 45 minutes of skilled therapy per week, at least 3 days per week of skilled therapy, and at least two types of nursing rehabilitation provided.

The four groups are further split by the ADLs residents accomplish.

Residents whose clinical conditions do not require skilled therapy are classified in lower categories, which descend in order of severity, number of services used, and the amount of time and expenditure required. These categories are divided into subgroups by the RUG-III ADL index, and then again by the number of services they receive.

Determining Case Mix Using RUG-III

One purpose of dividing residents into these subgroups is to assign weights to them in order to calculate a single number that represents the case mix of a given facility. Care provided directly to or for a resident is represented by a weight based on the staff time associated with that category. The more time and services cases in a category require, the larger weight they receive (Table 2). The nursing weight includes time spent daily by registered nurses (RNs), licensed practical nurses (LPNs), and aides. The time spent by each group is multiplied by a weight that represents their relative salaries (RN—1.34, LPN—1.02, and aide—0.67). The nursing/therapy weights include the above nursing time plus social work (1.83), PT (1.67), OT (2.57), SP/audiology (2.41), and transportation (0.67), on a weekly basis. The nursing and nursing/therapy weights are multiplied by the number of residents in each category to yield nursing case mix and nursing/therapy case mix. In calculating case mix for individual facilities, HCFA uses the RUG-III weights and applies them to the distribution of residents in a given facility. Table 2 shows the RUG-III subgroups and the weights assigned to them.

It should be noted that the case-mix weights represent the sample from the seven States used in the RUG-III classification design. Preliminary evidence shows that the wages used in building the weights vary regionally. In the future it may be possible to allow wages to vary across States, producing case mixes that better represent costs in different areas.[7] Since the weights are constant in the calculation of case mix, however, it is the distribution of residents that drives changes in case mix.

Applying RUG-III

Hypothetical case studies will help explain the RUG-III classification system by comparing residents with similar descriptions but disparate classifications. For example, Ms. A was diagnosed with stroke, cardiac dysrhythmia, hypertension, diabetes mellitus, contractures of the hip and hand, and experienced a urinary tract infection within the past 30 days. In addition, she has lost voluntary movement in her left arm and leg, and has an unsteady gait, pain almost daily, and some localized edema, but is continent. She can see, hear, understand, and make herself understood. She tires easily and carries out ADLs slowly. Her mood is frequently tearful and she expresses sadness about the loss of past life roles. She is concerned about her health and views herself, and is viewed by staff, as having potential for rehabilitation.

Her memory is good, although she does have some difficulty making decisions in new situations. She is involved in the daily life of the nursing home, interacts well with others, and is able to set her own goals. She does spend time in her own room in self-initiated activities.

Ms. A requires the assistance of one person to accomplish her personal hygiene, dressing, toileting (RUG-III ADL index score—4), bed mobility and transferring (ADL scores—4 each), locomotion, and eating (ADL score—2). She uses

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[7] A second staff-time study using the MDS+ began in Fall 1994. The new data will be used to validate the first staff time measurement study and to adjust the RUG-III classification system to the MDS Version 2.0 instrument to be published by HCFA in Spring 1995. Only very minor alterations of RUG-III are anticipated.

Table 2

RUG-III and MEDPAR Proxy Weights for Nursing and Nursing/Therapy

RUG-III Category and Intensity[1]	Number in NHCMQ Sample	Nursing Weight	Nursing/ Therapy Weight	MEDPAR Proxy Nursing Weight	MEDPAR Proxy Nursing/ Therapy Weight
Rehabilitation					
Total	552	1.37	2.28	—	—
Very High 14-18	37	1.79	3.68	1.29	3 14
Very High 8-13	77	1 18	3 01		
Very High 4-7	21	0.82	2.65		
High 15-18	23	1.93	2.83	1.43	2 41
High 12-14	51	1.50	2.47		
High 8-11	53	1.31	2.29		
High 4-7	24	1.06	2.14		
Medium 16-18	17	2.09	2.52	1.44	1.99
Medium 8-15	134	1.38	1.95		
Medium 4-7	16	1.25	1.74		
Low 12-18	61	1.36	1.52	1.28	1 44
Low 4-11	38	1.14	1.31		
Extensive Services					
Total	161	2.16	1.97	2.16	1 97
3	13	3.97	3.61		
2	38	2.65	2.44		
1	110	1.78	1 62		
Special Care					
Total	767	1 50	1.36	1.50	1 36
17-18	303	1.61	1 45		
14-16	372	1.47	1.33		
7-13	92	1.28	1.18		
Clinically Complex					
Total	2,398	1.05	0.98	1.05	0.98
17-18 D	55	1.46	1.34		
17-18	282	1.37	1.24		
11-16 D	204	1.19	1.11		
11-16	875	1.16	1.08		
6-10 D	89	1.08	1.02		
6-10	389	0.94	0.89		
4-5 D	72	0.76	0.73		
4-5	432	0.67	0.65		
Impaired Cognition					
Total	769	0.67	0.62	0.67	0 62
6-10 N	127	0.88	0.80		
6-10	278	0.80	0.73		
4-5 N	54	0.60	0.56		
4-5	310	0.49	0.46		

See footnotes at end of table.

pressure-relieving chair and bed pads and receives special attention for her skin. She undergoes PT and OT for 1 hour each, 5 days a week. Ms. A receives daily restorative/rehabilitative followup nursing care and skill training for eating, active and passive range of motion, transferring, dressing, grooming, locomotion, and participates in a bowel and bladder retraining program. Discharge from the nursing home is planned within the next 3 months.

As a stroke patient receiving two therapies five times a week, Ms. A is classified in the Very High Rehabilitation category. Mrs. A has an ADL index score of at least 14 (4+4+4+2). In case-mix calculations, her case receives a nursing weight of 1.79 and a nursing/therapy weight of 3.68.

Table 2—Continued

RUG-III and MEDPAR Proxy Weights for Nursing and Nursing/Therapy

RUG-III Category and Intensity[*]	Number in NHCMQ Sample	Nursing Weight	Nursing/ Therapy Weight	MEDPAR Proxy Nursing Weight	MEDPAR Proxy Nursing/ Therapy Weight
Behavior Problems					
Total	125	0.57	0.54	NOC	NOC
6-10 N	14	0.87	0.79	0.79	0.73
6-10	31	0.78	0.72		
4-5 N	11	0.58	0.53		
4-5	69	0.41	0.41		
Reduced Physical Function					
Total	2,876	0.79	0.73	NOC	NOC
16-18 N	217	1.19	1.07	0.79	0.73
16-18	356	1.13	1.02		
11-15 N	333	1.01	0.92		
11-15	609	1.00	0.91		
9-10 N	53	0.86	0.78		
9-10	124	0.77	0.71		
6-8 N	45	0.68	0.65		
6-8	147	0.66	0.62		
4-5 N	108	0.52	0.52		
4-5	884	0.39	0.39		

[*] Numbers represent ADL levels. D indicates depressed state of mind; N indicates nursing rehabilitation services given.

NOTES: RUG-III is Resource Utilization Group, Version III. MEDPAR is Medicare provider analysis and review file. NHCMQ is Nursing Home Case Mix Quality demonstration. NOC is not otherwise classified.

SOURCE: Fries, B.E.: Multistate Nursing Home Case Mix and Quality Demonstration: Description of the Resource Utilization Group, Version III (RUG-III) System. Unpublished. March 20, 1992.

A non-rehabilitation example, Ms. B, has multiple sclerosis. At the present time she is recovering from a bout of pneumonia. She also had a urinary tract infection within the past 30 days. She has lost voluntary movement in her left arm and leg and cannot balance herself. She is not bedfast, however, and is in a wheelchair during the day. She has a history of pressure sores, but none are present at this time. There are contractures of her left hip, hand, shoulder, and foot. She complains of constipation and is sometimes incontinent of the bladder. She is able to see, hear, fully understand what is said, and is understood.

Her memory is good and she is independent in her decisionmaking. Her mood, however, is tearful and she expresses distress. She grieves for her past life as a professional musician, and she is often withdrawn and has been verbally abusive to her roommate during the past week.

Ms. B uses extensive assistance with transferring (RUG-III ADL index score—4), locomotion, toileting (ADL score—4), and limited assistance with bed mobility (ADL score—3), personal hygiene, and dressing. As she has had a history of pressure sores, she uses bed and chair pressure prevention pads and receives special skin care, positioning, and turning regularly over the day. She is on intake and output, and the nursing staff provides passive range of motion and skill training for transferring with a trapeze while encouraging active range of motion for her unaffected limbs. She also began a bowel and bladder retraining program last week. Any discharge plan for Ms. B is uncertain at this time.

With multiple sclerosis and a high level of ADL dependency, Ms. B is classified in the Special Care category. Her ADL score is at least 12 (4+3+4+1 [since she eats without assistance]). Service counts and mental state are not used in the Special Care category, so her depressed mood does not factor into her classification per se, but influences her plan of care. In RUG-III case-mix calculations, Ms. B is assigned a nursing weight of 1.28 and a nursing/therapy weight of 1.18. Note that these weights are lower than those assigned to Ms. A, the Rehabilitation patient, despite the many similarities in their descriptions.

The MEDPAR Proxy

Since the MDS+ assessment tool is used in fewer than 12 States, it is not possible to analyze case mix on a national level by applying the RUG-III classification system to MDS+ data. As an alternative, MEDPAR can be used to approximate the RUG-III categories for all Medicare SNF residents nationwide using Medicare claims. Diagnosis and revenue codes on the claims identify clinical conditions and the types of services rendered, making it possible to assign residents to the RUG-III categories. For the Rehabilitation category, the MEDPAR proxy directly reproduces the variety of therapy given, and approximates frequency and duration using Part A charges for skilled therapy thought to be commensurate with certain patterns of service.

One of the outgrowths of the multi-State NHCMQ demonstration design, then, was the MEDPAR analog to the RUG-III classification system. It was built from the charges for rehabilitation services and diagnosis and procedure codes recorded on Part A claims.

METHOD

The development of the MEDPAR proxy involved a logical process of gathering background information, assessing data sources, aggregating cases into homogenous groups, and constructing an overall scheme from the smaller components. Documents provided background information crucial in determining the levels of charges for each category which best approximated the service patterns represented in the RUG-III classification criteria. This section describes the documents and data bases consulted in developing the proxy, then discusses the method used to establish the charge ranges which delineate the Rehabilitation category. The technique used to create the non-rehabilitation categories is then addressed. Finally, the determination of case mix using the proxy is described. Each of these steps is important to understanding what a case-mix measure using the MEDPAR proxy, and the proxy itself, actually represent.

Background Sources

Written sources used in developing the proxy included a study from the Urban Institute on SNF therapy use patterns (Liu, 1993), HCFA's 1988 Medicare SNF coverage guidelines, and 1992 LOS data for SNFs (Helbing and Cornelius, 1993).

In a 1993 study, Liu compared Part A and Part B charges for the same types of therapy, providing a complete overview of all therapy provided under Medicare. The study linked the MEDPAR SNF file with the National Claims History files and the Medicare/Medicaid Automated Certification System. Tables and documentation were used to identify residents of nursing homes with Medicare Part A covered stays who did or did not receive therapy. Only 41.3 percent of covered SNF stays involved no therapy services at all. In addition, Liu's study offered the average Part A charges for each type of skilled therapy. These means helped the authors choose upper and lower limits of charges that best represented the patterns of service used to classify Rehabilitation patients in the RUG-III system.

The 1988 Medicare SNF coverage guidelines described the required levels of nursing and skilled therapy to qualify for Medicare coverage. They were promulgated in response to variation in coverage decisions among fiscal intermediaries, growing numbers of lawsuits challenging coverage decisions, and a threatened petition for court rulemaking (Office of Inspector General, 1991). In general, the guidelines had the effect of extending Medicare coverage to new classes of the frail elderly. The changes led to increased SNF admissions, slightly longer LOSs, and 27-percent-higher Medicare SNF expenditures. The NHCMQ design will use RUG-III to cover the same types of stays as are permitted by the 1988 guidelines, using a payment method that is easier to administer and consistent across States. Hence, the 1988 coverage criteria serve as a basis for the MEDPAR proxy as well.

The MEDPAR analog also relies on average SNF charges and LOS tables derived from the 1990 MEDPAR SNF file, reported by Helbing and Cornelius (1993). LOS tables offered average Part A therapy charges for stays of various lengths, including stays under 8 days, 9-20 days, 21-40 days, 41-60 days, 61-80 days, and 81 days or more. Charges were divided by the average number of days in the stay categories to yield a per day charge. Per day charges were used as indicators of the average frequency and duration of therapy visits.

Data Files

The files used were the MEDPAR and MDS+ data sets. MEDPAR is the complete collection of Part A claims submitted to Medicare for payment. Only the claims for SNF care are relevant to the analog. Constructed by HCFA's Bureau of Data Management and Strategy, the MEDPAR SNF files contain information on completed Medicare stays of SNF residents. The information includes duration of covered stays, age, gender, and race of the residents, and the geographic locations of the resident and the provider. Central to this study, MEDPAR SNF contains information on charges for PT, OT, and SP services, and revenue codes for other services. The construction of the proxy involved MEDPAR SNF data from 1990, edited to eliminate invalid records.

MDS+ is part of the Resident Assessment Instrument used to gather data in the NHCMQ demonstration States.[8] The second part is the Resident Assessment Protocols, which signal potential problem or risk areas and offer guidelines for residents' plans of care. The MDS+ expands the original assessment tool, the MDS, by adding items and increasing the number of response categories to provide greater detail regarding resident conditions and services received. For example, MDS+ reports the number of minutes of therapy given and the rehabilitative/restorative nursing care provided. MDS+ collects resident background information, such as the date of assessment, marital status, lifetime occupation, and the payment source. It also reports current resident health status in terms of resident diagnosis, complicating conditions, and use of medication. Certain conditions included in the MDS+ (for example, pressure ulcers) serve as indicators of the quality of care residents receive.

The computerized MDS+ system of records features over 400,000 assessments from Kansas, Maine, Mississippi, and South Dakota. The earliest assessments in the data base were made on May 1, 1992, and approximately two-thirds of the individuals in the file have assessments over at least three points in time. New York added some 500,000 assessments to the HCFA data base beginning in November 1992.

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[8] Results from a pilot study suggest that MDS+ data can be used to enhance consistency in determining Medicare SNF coverage (Heine, 1994).

Responses to the MDS+ assessment instrument serve as the basis for classification of residents into the RUG-III system. In the creation of the MEDPAR proxy, MDS+ item definitions thus formed the key against which MEDPAR diagnosis and revenue service codes were matched.

The Rehabilitation Category

The most complex RUG-III category to approximate using the MEDPAR data base was Rehabilitation. Since service patterns had to be approximated using ranges of therapy charges, great attention was paid to developing decision rules that would yield the most accurate description possible using Medicare claims. In addition, there are four levels of intensity within the Rehabilitation category. The Rehabilitation category thus requires the most detailed explanation and is addressed by each of its subdivisions in turn. HCFA researchers set upper and lower charge limits for the Rehabilitation category first, and then created the intermediary splits.

Construction

As previously mentioned, nursing home case mix is not a direct function of diagnosis, as it is with hospital inpatient services. Diagnosis obviously has a role in determining what services a resident receives, but it is the services themselves, with the staff time required to provide them, that determine case mix in nursing homes. Thus, for the Rehabilitation categories, the RUG-III system uses measures of staff time and service frequency, variety, and duration to classify residents. The criteria are in the form of minimum numbers of minutes of therapy a day and/or week, minimum frequencies of therapy sessions over a week, and minimum numbers of therapy disciplines used per resident. While the MEDPAR proxy can directly reproduce the variety of therapy given, frequency and duration can only be approximated using Part A charges for skilled therapy thought to be commensurate with certain patterns of service. It should be kept in mind, then, that the ranges of charges used in the MEDPAR analog to represent certain therapy patterns are based on educated guesses about therapy and its cost. Since the authors used their own judgment, their choices may seem somewhat arbitrary.

Liu (1993) revealed the following therapy service patterns:

- PT was provided in 56.3 percent of total SNF stays.
- OT was provided in 26.1 percent of stays.
- SP services were given in 9 percent of stays.

This information offered insight into the distribution of services and guided the formation of the categories. In addition:

- 32.1 percent of stays included a single therapy.
- 20.8 percent of stays included two therapies.
- 5.9 percent of stays included all three therapies.
- 41.3 percent of stays did not involve any therapy.

The four Rehabilitation groups for the MEDPAR proxy were determined using ranges of charges to approximate the RUG-III criteria. The Low Intensity group ranges from $250 to $1,000 in any combination of types of skilled therapy. The Medium Intensity group ranges from $1,001 to $2,000 in any combination of therapies. The High Intensity group ranges from $2,001 to

$3,500, with one or more therapies represented. Finally, the Very High Intensity group includes any charge greater than $3,500, with at least two therapies represented, one of which has charges greater than $1,500 (note that if only one therapy is used, the case is classified in the High group, regardless of the charge amount).

Low Rehabilitation Group Determination

The lower boundary of the Rehabilitation category for the MEDPAR proxy was set at $250. Any resident with total therapy charges under $250 was assumed to have received a primary evaluation to determine the need for therapy which did not result in more than two treatments. The Rehabilitation—Low Intensity group requires skilled therapy at least 3 days a week for no less than 10 minutes a day, with a required minimum of 45 minutes per week. This second criterion would be consistent with a 15-minute unit of service 3 days a week, a typical pattern. In addition, at least two forms of nursing rehabilitation must be provided 5 days a week.

Using the MEDPAR file, there was no way to approximate the nursing rehabilitation component of the RUG-III Rehabilitation—Low group. It was possible, however, to model under 5 days a week of skilled therapy using therapy charges that parallel such a pattern of treatment.

Liu (1993) revealed a comparatively large proportion of SNF stays with therapy service charges in the $1 to $250 range. These included 19.5 percent of stays involving PT, 25.9 percent of stays with OT, and 27.7 percent of stays with SP. The 1990 LOS tables previously mentioned provided information on the average covered therapy charge per stay (Helbing and Cornelius, 1993). For this group of stays, LOS was divided into two levels, those that lasted 1-8 days (with a 5-day average), and those that lasted 9-20 days (with a 14-day average).[9] Only 44 percent of the shorter stays had any covered therapy charges. For these, the average covered therapy charge per stay was $401, or $133 per day, if 2 days are assumed to fall on the weekend, since therapy is generally not provided on the weekend. For the longer stays, 65 percent had some covered therapy charges. The average covered therapy charge per stay for this group was $1,046, or $105 a day, excluding weekends.

Obviously, the floor of the Rehabilitation category should be sufficiently lower than the average charge per stay to encompass legitimate therapy charges that comprise the low side of the mean. At $250, a 5-day stay would cost $50 a day and a 14-day stay would cost about $18. Each of these charges is too low to represent actual therapy treatments, which typically cost $65 or more per visit, depending on their duration. Based on these analyses, charges under $250 per stay were assumed to be evaluations, with possible therapist consultation, which did not result in more than two treatments.

Very High Rehabilitation Group Determination

The Rehabilitation—Very High Intensity group was intended to apply only to the most complex cases requiring therapy well above the average amount of service time. This translates into higher charges for therapy services, both because treatment is more frequent and complex, and because LOS is longer than for other skilled rehabilitation groups. In line with the intended complexity of this classification group, the lowest charge for the Rehabilitation—Very

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[9] Average LOS ranges (1-8, 9-20, etc.) represent covered days of care per admission, rounded to the nearest whole number. See Table 5.10 in Helbing and Cornelius (1993).

High group was set at $3,500, with at least one discipline having a minimum of $1,500 in covered charges.

The RUG-III criteria for Rehabilitation—Very High are:

- Two of the three therapy disciplines represented.
- 450 minutes of treatment a week across the three services.
- One discipline providing services at least 5 days a week.

By definition, the highest Rehabilitation group must involve at least two of the three disciplines. Liu (1993) showed that 26.7 percent of SNF stays met this criterion. The mean covered charges for stays involving two or three types of therapy were:

- PT and OT—35,500 stays with mean total charges of $2,481.
- PT and SP—3,586 stays with mean total charges of $2,219.
- OT and SP—568 stays with mean total charges of $2,745.
- PT, OT, and SP—11,295 stays with mean total charges of $5,611 (median $3,669).

The longer stays in the 1990 LOS tables were divided into three levels, 41-60 days (a 49-day average), 61-80 days (a 70-day average), and 81-100 days (an average of 97 days) (Helbing and Cornelius, 1993). The 49-day group had average total covered therapy charges of $3,312 per stay, or $94 per service day (assuming 35 weekdays). The middle group had average therapy charges of $4,117, or spread over 50 service days, $82 a day. The 97-day group had average charges of $4,610, or $65 per day (over 71 service days). The shortest stays appear to involve the more intense service use, rather than the longer stays, which arrive at higher average charges by virtue of their duration rather than their intensity.

To differentiate between Rehabilitation—Very High and Rehabilitation—High, the Very High floor was set at $3,500, which is above all the means for combinations of therapy listed earlier, except cases using all three disciplines. Note that the figure is slightly below the three-discipline median, and therefore includes the majority of three-discipline charges per stay. The two longest LOS periods fall into the Very High category, while the 49-day group average falls into the High category, except for very expensive stays on the high side of the mean.

The final criterion for classification in the Rehabilitation—Very High group is a minimum of $1,500 in charges in one discipline. Liu (1993) found that among those stays with therapy service, single discipline covered charges of at least $2,000 occurred in 17.3 percent of stays involving PT, 17.1 percent of stays with OT, and 23.1 percent of stays with SP. Assuming at least 30 minutes of service a day, a minimum of $1,500 in charges would be incurred during a 5-day-a-week pattern of service in a given therapy. To approximate the required intensity over 5 days a week of service, then, the model requires charges of at least $1,500 in one discipline. This is more than one-half of the mean charge for two disciplines, but only one-quarter of the mean charge for stays involving all three disciplines.

Medium and High Rehabilitation Group Determination

The boundaries for the Medium and High groups, obviously, lie between those for the Low and Very High groups. The Medium group has covered charges in the $1,001 to $2,000 range, in any combination of therapies, and the High group ranges from $2,001 to $3,500, in any combination. The $3,500 cap on the High group can be exceeded if only one therapy is provided.

In the RUG-III classification system, these two intermediate groups are not driven by a specific number of disciplines represented. Both require at least 5 days a week of skilled therapy, but they are split according to weekly treatment time: the High category requires at least 300 minutes of therapy a week (typically five 60-minute sessions), and the Medium category requires only 150 minutes a week (or five 30-minute sessions).

In the MEDPAR crosswalk, the Rehabilitation—High category may include one therapy at any level of charges above $2,001, or two or three therapies if the total charges are less than $3,500. The lower boundary was set at $2,001 based on the same information used in setting the floor for the Very High group. The LOS tables (Helbing and Cornelius, 1993) confirm this choice, showing stays of 21-40 days to have average total therapy charges of $2,078.

The Rehabilitation—Medium group can also consist of one, two, or three therapies. Liu (1993) found the mean charges for a single discipline to be $916 for PT, $724 for OT, and $933 for SP. As previously mentioned, the average total covered therapy charges for stays from 9-20 days (keeping in mind that stays of 8 days or fewer would probably not get in 5 treatment days) was $1,046. Based on these data, the lower boundary for the Rehabilitation—Medium group was set at $1,000 to avoid including residents with less than 5 days of therapy service. Although this may seem inconsistent with the Very High Intensity requirement of $1,500 to represent a 5-day-a-week pattern of service, the Very High requirement is intended to be more stringent. In the Medium Intensity group, residents may receive less than 30 minutes of service a day, and different combinations of therapy could be used to meet the 5-day-a-week requirement. If this involved 3 days of OT and 2 days of PT, for example, a 5-day service pattern could easily cost less than $1,500, since OT is less expensive than PT ($724 versus $916).

Non-Rehabilitation Categories

MEDPAR contains variables describing diagnoses and procedures which are based on the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM). The ICD-9-CM system uses five-digit codes, the first three digits representing broad classes of diagnoses and the last two representing more detailed subclassifications. The proxies for the non-rehabilitation categories in the RUG-III classification were created by matching the numerical diagnosis or procedure codes in MEDPAR with the specific clinical criteria used to classify residents in the Extensive Services, Special Care, or Clinically Complex categories, with the assumption that the same range of services are represented by the diagnosis code.

One of the authors, a gerontological nurse clinician and researcher (who had assisted in the development of the RSM field test), searched ICD-9-CM Volumes 1, 2, and 3 for identical or comparable words or descriptors of diagnoses, treatments, and procedures that would meet the intent of the RSM items used in the development of the RUG-III classification. She used the tables of contents and the indexes to find identical wording, descriptors, or appropriate commonly associated treatments and procedures. For example, the RSM item "burns" is matched to ICD-9-CM codes 940-949.5, "burns." Similarly, ICD-9-CM codes 038-038.9 (septicemia), 998.5 (postoperative septicemia), and 999.3 (septicemia following infusion, injection, or transfusion) approximate the RSM item "septicemia." Often, there were more than one ICD-9-CM code which might match the RSM item. In such cases, all applicable ICD-9-CM codes were used. Categorical exclusions in the ICD-9-CM codebooks were noted. Table 3 presents in detail the MDS+ variables and qualifying criteria used for RUG-III and shows the proxy ICD-9-CM codes, descriptors, and qualifying criteria used to represent the MDS+ items.

Certain RUG-III criteria could not be satisfactorily matched to any ICD-9-CM code. In the Special Care category, for example, intravenous medication had no corresponding code. In the Clinically Complex category, terminal illness and physician visits cannot be modeled. Roughly 20 percent of residents classified as Clinically Complex are so categorized due to their number of physician visits. This means that in the MEDPAR proxy, these residents are probably falling into the not otherwise classified group. Finally, parenteral feeding, under the Extensive Services classification, is approximated by "unspecified machine dependent," which refers to the commonly used feeding pump. Unfortunately, the ICD-9-CM code does not distinguish between parenteral feeding pumps and intravenous pumps; this detracts from the precision of the match.

Similarly, the proxy for Impaired Cognition was modeled using only the diagnosis code for Alzheimer's disease (ICD-9-CM code 290). It does not include residents with Alzheimer's who fit into a higher category due to other problems, neurological Alzheimer's (331.0), or any of the other codings for dementia. While the structure of RUG-III purposely excluded residents with other problems from this lower group, future revisions of the MEDPAR proxy should expand this category to include other codings for dementia.

There is insufficient information in the MEDPAR data base to approximate the criteria for the RUG-III categories Behavior Problems and Reduced Physical Function, so the criteria for these categories were not used in the proxy. Residents who cannot be classified in the top eight groups are combined in a final category, not otherwise classified. These include residents who would be classified in the Behavior Problems or Reduced Physical Function categories of the RUG scale, as well as some Impaired Cognition residents without more complicated physical problems.

Case Mix Using the Proxy

Recall that in the RUG-III system, the case-mix index is a function of the distribution of residents in each of the categories, further detailed across the ADL index, and then by service counts, depression, or nursing rehabilitation services (Table 2). ADLs, nursing rehabilitation, depression, and service counts could not be modelled using MEDPAR. For the MEDPAR proxy, then, the nursing and nursing/therapy weights are not detailed to the second and third levels of the RUG-III system. In the Rehabilitation category, weights for the four intensity levels were collapsed from the subdivisions (Table 2). In addition, the Behavior Problems and Reduced Physical Function categories were combined as not otherwise classified for the MEDPAR proxy, as previously discussed. Residents in this category are included in case-mix calculations using the nursing and nursing/therapy weights assigned to Reduced Physical Function in the RUG-III system (0.79 and 0.73). In the RUG-III system, the Behavior Problems and Impaired Cognition categories have weights of 0.57 and 0.54, and 0.67 and 0.62, respectively. Thus, in case-mix calculations using the proxy, these residents receive a higher weight than they would using the MDS+ data base. This tends to bias case mix upward, but probably only slightly, since these groups

Table 3

MDS+/MEDPAR Crosswalk

	MDS +		MEDPAR	
RUG-III Group	Items Used	Criteria	ICD-9-CM or MEDPAR Source Code	Descriptor
Rehabilitation				
Very High Intensity, Multidisciplinary	N,1, b, (a, b, c) Box A and B a. Speech b. Occupational Therapy c. Physical Therapy	Box A - Two of the 3 = 1+ and one of the 3 = 5+ Box B - Sum of a + b + c = 450	OT, PT, Speech V57.0 to V57.9	Covered Charge $250+ Covered Charge $3,501 + 2 of 3 Therapies and 1 Therapy > $1,500
High Intensity	N, 1, b, (a, b, c) Box A and B a. Speech b. Occupational Therapy c. Physical Therapy	Box A - Combination of a + b + c = 5+ and Box B - Sum of a + b + c = 300	V57.0 to V57.9	Covered Charge $2,001 - $3,500 and 2 Therapies or $2,001 + and Only 1 Therapy
Medium Intensity	N, 1, b, (a, b, c) Box A and B a. Speech b. Occupational Therapy c. Physical Therapy	Box A - Combination of a + b + c = 5+ and Box B - Sum of a + b + c = 150	V57.0 to V57.9	Covered Charge $1,001 - $2,000 and Any Combination of Therapies
Low Intensity	N, 1, b, (a, b, c) Box A and B a. Speech b. Occupational Therapy c. Physical Therapy N, 2, (a, b, c, f, g, h, i, j) a. Range of Motion (Passive) c. Splint/brace Assistance f. Locomotion/Mobility g. Dressing/Grooming h. Eating/Swallowing i. Transfer j. Amputation Care	Box A - Combination of a + b + c = 3+ and Box B - Sum of a + b + c = 45 and N, 2 - Any two = 5 + (a, b, c, f, g, h, i, j)	V57.0 to V57.9	Covered Charge $250 - $1,000 and Any Combination of Therapies
Extensive Services		At Least One Checked		
Parenteral Feeding	L, 4, a (Parenteral/IV) N, 1, a,(d, e, j)		V46.9	Unspecified Machine Dependence (IV Pump)
Suctioning	d. Suctioning		V46.0 V55	Aspirator Attention Artificial Opening
Tracheostomy	e. Trach Care		V44.0	Tracheostomy
Ventilator/Respirator	j. Ventilator/Respirator		V46.1	Respirator

See notes at end of table.

Table 3—Continued
MDS+/MEDPAR Crosswalk

	MDS +		MEDPAR	
RUG-III Group	Items Used	Criteria	ICD-9-CM or MEDPAR Source Code	Descriptor
Special Care		At Least One Checked or Answered as Specified		
Burns	J, 4, c (Burns)		940 to 949.5	All Types and Locations
Coma	B, 1, 1 (Coma)		780	Coma Excludes 780.3 Eclampsia Excludes 779 2 Newborn
			586	
			345.3	Grand Mal, Status, Epileptic
Fever With:				
Vomiting	K, 3, e and K, 3, m or L, 3, b or		008 8	
Weight Loss	K, 1 or L, 2, c = 1		783.2 783.3 260-263.0	Abnormal Weight Loss, Feeding Difficulties, and Nutritional Deficiencies
Pneumonia			480-487	See ICD-9-CM Volume 1 for Exclusions
Dehydration			276.5	Volume Depletion
			276.0	Hypertonic
			276.1	Hypotonic
Multiple Sclerosis	K, 1, l (Multiple Sclerosis)		340	Multiple Sclerosis
Pressure Ulcers	J, 2, c or d = 1+ (Stage 3 or 4 Pressure Ulcer)		707.0 to 707.9	Pressure Ulcers
Quadriplegia	H, 4, d (Quadriplegia)		344.0	Quadriplegia
Septicemia			038-038.9	
			998.5	Postoperative
			999.3	Following Infusion, Injection, Transfusion
IV Medication			No List	N, 1, a, f (IV Medications)
Radiation Treatments	N, 1, a, b (Radiation Treatments)		V15.3	Irradiation (Aftercare)
			V58.0	Radiotherapy
			V66 1	Following Radiotherapy
Tube Feeding	L, 4, b (Feeding Tube)		V44 1	Tube Feeding

See notes at end of table

Table 3—Continued
MDS+/MEDPAR Crosswalk

RUG-III Group	MDS +		MEDPAR	
	Items Used	Criteria	ICD-9-CM or MEDPAR Source Code	Descriptor
Clinically Complex		At Least One Checked or Answered as Specified		
Aphasia	K, 1, j (Aphasia)		784.3	
Aspiration	K, 3, j (Lung Aspirations)		507.0	
Cerebral Palsy	I, 12, b (Cerebral Palsy)		343.0 to 343.9	
Dehydration	L, 3, b (Dehydration)		276.5 276.0 276.1	Volume Depletion Hypertonic Hypotonic
Hemiplegia	H, 4, c (Hemiplegia)		342.0 to 342.9	Excludes Congenital and Infantile
Internal Bleeding	K, 3, g (Internal Bleeding)		578 to 578.9	Excludes Newborn
Pneumonia	K, 1, o (Pneumonia)		480 to 487	See ICD-9-CM Volume 1 for Exclusions
Stasis Ulcer	J, 1 = 1 (Stasis Ulcer)		434.0 to 454.9	
Terminal Illness	K, 1, z (Experiencing Terminal Illness)		No List	Death Within 60 Days
Urinary Tract Infection	K, 1, e e (Urinary Tract Infection)		599.0	
Chemotherapy	N, 1, a a (Chemotherapy)		V58.1 V66.2	Maintenance Chemotherapy Following Chemotherapy
Dialysis	N, 1, a c (Dialysis)		V45.1 V56 to V56.8 V58.8 V58.9	Renal Dialysis Status Excludes Billysis Status Other Specified Aftercare Unspecified Aftercare
Respiratory Therapy	N, 1, b e Box A = 1+ (Respiratory Therapy)			Only Part Time Breathing Exercises
Transfusions	N, a g (Transfusions)		V58.2	Blood Transfusion Without Reported Diagnosis
Wound Care Other Than Pressure Ulcer	J, 4, (d, e, or l) and J, 5, (d, or e) or J, 7, c (Foot Dressings)		V58.3	Attention to Dressing/Sutures, Dressing Changes
Physician Visits	N, 6 = 4+ (Physician Visits)		No List	Does Not Apply at Admission

See notes at end of table

Table 3—Continued

MDS+/MEDPAR Crosswalk

	MDS +		MEDPAR	
RUG-III Group	Items Used	Criteria	ICD-9-CM or MEDPAR Source Code	Descriptor
Impaired Cognition Impairment in All: Decisionmaking Recall Short-Term Memory	B, 2, a = 1 (Short-Term Memory) and B, 3, a, b, c, or d Not Checked and B, 4 = 1 or More	All Three Answered as Specified	290.0	
Behavior Problems	E, 3, a or b or c or d = 2 or K, 3, f (Hallucinations/Delusions) E, 3, a (Wandering) E, 3, b (Verbally Abusive) E, 3, c (Physically Abusive) E, 3, d (Socially Inappropriate)	Any One of "E" Variables = 2 or K, 3, f Checked	Not Used	
Reduced Physical Function	H, 1, a (Bed Mobility) H, 1, b (Transfer) H, 1, f (Toilet use) H, 2, a b f (Support)	Self-Performed Score 0 or 1 = 1 (0 - Independent) (1 - Supervision) Self-Performed Score 2 = 3 (2 - Limited Assistance) Self-Performed Score 3 or 4 and Support Score 2 = 3 (3 - Extensive Assistance) (4 - Total Dependence) Support (2 - One Person) Self-Performed Score 3 or 4 and Support Score 3 = 4 (3 - Extensive Assistance) (4 - Total Dependence) Support (2 - Two Persons)	Not Used	
	H, 1, e (Eating)	Self-Performed Score 0 or 1 = 1 (0 - Independent) (1 - Supervision) Self-Performed Score 2 = 2 (2 - Limited Assistance) Self-Performed Score 3 or 4 = 3 (3 - Extensive Assistance) (4 - Total Dependence) (8 - Not Feed and L4 a or b Checked - IV or Tube Feeding)		

NOTES: MDS+ is Minimum Data Set Plus. MEDPAR is Medicare provider analysis and review. ICD-9-CM is *International Classification of Diseases, 9th Revision, Clinical Modification*. OT is occupational therapy. PT is physical therapy. IV is intravenous.

SOURCE: Cornelius, E., Health Care Financing Administration; Feldman, J., Allied Technology Group, Inc.; Marsteller, J.A., and Liu, K., Urban Institute, 1994.

are not a very large proportion of the not otherwise classified RUG-III category.

On the other hand, the MDS+ includes residents who are not being paid for by Medicare, possibly due to the expiration of their coverage. Thus some MDS+ stays are longer term than those represented in the MEDPAR file. This may indicate higher severity/acuity of illness among the long-term residents, shifting MDS+ case mix upward compared with case mix using the MEDPAR analog. Long stays do not coincide in every case with higher classifications using RUG-III or the MEDPAR analog, however. In addition, since the most intensive service provision likely occurs at the beginning of the stay, MEDPAR files would record the most intensive and expensive part of a resident's total stay, biasing case mix using the analog upward. Given these opposing possibilities, the effect of the longer stay population on case mix is unclear.

APPLICATIONS

The proxy makes it possible to characterize typical Medicare residents in SNFs across the Nation. Using the 1992 MEDPAR SNF file, simple frequencies were run to describe the distribution of 917,526 SNF residents across the RUG-III proxy categories (Table 4). Clearly, the largest part of SNF residents, 60.27 percent, are classified in the Rehabilitation groups. Typical diagnoses in these groups include fractures, sprains, and cerebrovascular disease. Among the non-rehabilitation categories, the Special Care category constitutes the largest group, representing 11.27 percent of residents. The Clinically Complex category is not much smaller, with 9.13 percent of SNF residents.

Table 4

RUG-III Groups in the 1992 MEDPAR SNF File

RUG-III Group	Percentage of the Sample
Rehabilitation—Very High	14.14
Rehabilitation—High	12.52
Rehabilitation—Medium	14.18
Rehabilitation—Low	19.43
Extensive Services	0.75
Special Care	11.27
Clinically Complex	9.13
Impaired Cognition	1.15
Not-Otherwise Classified	17.43

NOTE RUG-III is Resource Utilization Groups, Version III. MEDPAR is Medicare provider analysis and review file. SNF is skilled nursing facility.

SOURCE. Urban Institute 1992 MEDPAR SNF data base.

Facility administrators can compare the distribution of their own residents to the national distribution to get an idea of the severity of their resident case mix compared with the national mix. If, for example, 8 percent of a facility's residents are Clinically Complex, then that facility can be said to have fewer Clinically Complex residents than the national average. This information could be helpful in assessing claims of extraordinary case mix.

Another useful result of the creation of the MEDPAR proxy for the RUG-III system is the ability to estimate SNF case mix on a national basis. Tables 5 and 6 show nursing and nursing/therapy case mix from 1987 to 1992 for three types of SNFs: swing beds, hospital-based, and freestanding facilities. These case mix numbers were calculated using the MEDPAR proxy weights shown in Table 2. The MEDPAR SNF files were sorted by type of facility, then the overall distribution of residents within each type was multiplied by the nursing and nursing/therapy weights for the categories, and divided by the total number of residents in that type of facility.

Tables 5 and 6 show an across-the-board increase in case mix over time. One is also struck by the more rapid increase in freestanding SNF nursing/therapy case mix, which has now surpassed hospital-based SNF nursing/therapy case mix. Freestanding SNF nursing case mix is still the lowest, however, suggesting that some freestanding facilities

Table 5

Nationwide Nursing Case Mix: 1987-92

Facility Type	1987	1988	1989	1990	1991	1992
Total	1.13	1.14	1.14	1.17	1.19	1.20
Unknown	1.15	1.06	1.13	1.29	0.81	1.11
Swing Beds	1.16	1.17	1.17	1.19	1.20	1.21
Hospital-Based	1.16	1.17	1.19	1.20	1.23	1.23
Freestanding	1.12	1.13	1.13	1.17	1.18	1.20

SOURCE. Urban Institute Medicare provider analysis and review skilled nursing facility data base, 1987-92.

Table 6

Nationwide Nursing/Therapy Case Mix: 1987-92

Facility Type	1987	1988	1989	1990	1991	1992
Total	1.19	1.22	1.24	1.34	1.44	1.54
Unknown	1.16	1.11	1.13	1.41	0.77	1.35
Swing Beds	1.18	1.19	1.21	1.24	1.26	1.29
Hospital-Based	1.24	1.29	1.33	1.38	1.47	1.52
Freestanding	1.18	1.22	1.23	1.35	1.47	1.58

SOURCE Urban Institute Medicare provider analysis and review skilled nursing facility data base, 1987-92.

are specializing in therapy services. Swing-bed hospitals lack the patient volume to support therapy staffs and as a result often serve as short-term recovery beds. Residents requiring longer term and rehabilitative care are likely referred elsewhere, hence swing beds' much lower nursing/therapy case mix.

For more detailed comparison, Table 7 presents case mix by State and facility type. Although aggregate national statistics show that freestanding SNF nursing/therapy case mix has outstripped hospital-based SNFs, this is not true in 18 States and one territory. Also contrary to the national trends, swing-bed hospitals have higher case mix numbers than both hospital-based and freestanding facilities, for both nursing and nursing/therapy, in New York and North Dakota. Similarly, in Alabama and Mississippi, swing-bed hospitals have higher nursing and nursing/therapy case mix than hospital-based SNFs. Vermont and Maryland also diverge from national trends in that their swing-bed nursing case mix is highest among the provider-types, and their swing-bed nursing/therapy case mix is higher than the freestanding SNF nursing/therapy case mix but lower than hospital-based SNF nursing/therapy case mix.

California and Nevada have high overall case mixes for both nursing and nursing/therapy. States with high nursing case mix across provider types include Tennessee, Alaska, and Utah, while Florida, Colorado, Arizona, Oregon, Washington, and Wisconsin have high overall nursing/therapy case mixes. Hospital-based SNFs in Delaware, New Hampshire, and Alaska have particularly high nursing/therapy case mix, at 2.21, 2.05, and 1.96, respectively. States with low overall case mix numbers for both nursing and nursing/therapy include South Carolina, New York (further discussed later), North Dakota, and Montana. Puerto Rico, Nebraska, and South Dakota have low overall nursing/therapy case mixes, and the District of Columbia, Maine, Michigan, and North Carolina have low nursing case mixes.

DISCUSSION

The MEDPAR analog offers a great deal of case mix information that could not be determined before on a national basis.

Table 7

State Nursing Case Mix (NCM) and Nursing/Therapy Case Mix (NTCM), by Type of Facility: 1992

State	Total		Unknown		Swing Bed		Hospital-Based		Freestanding	
	NCM	NTCM	NCM	NTCM	NCM	NTCM	NCM	NTCM	NCM	NTCM
Total	1.20	1.54	1.11	1.35	1.21	1.29	1.23	1.52	1.20	1.58
Alabama	1.20	1.45	0.79	0.73	1.24	1.26	1.17	1.17	1.20	1.51
Alaska	1.27	1.68	NA	NA	1.29	1.49	1.33	1.96	1.17	1.74
Arizona	1.23	1.75	1.17	1.47	1.19	1.27	1.23	1.55	1.23	1.83
Arkansas	1.21	1.47	1.08	1.42	1.20	1.33	1.29	1.63	1.20	1.53
California	1.26	1.79	1.21	1.61	1.19	1.27	1.28	1.75	1.26	1.80
Colorado	1.24	1.76	1.38	1.90	1.19	1.27	1.28	1.68	1.25	1.88
Connecticut	1.16	1.47	0.87	0.89	NA	NA	1.21	1.61	1.16	1.48
Delaware	1.23	1.62	0.79	0.73	NA	NA	1.30	2.21	1.24	1.61
District of Columbia	1.13	1.39	0.97	1.12	NA	NA	1.15	1.06	1.17	1.50
Florida	1.23	1.87	1.21	1.78	1.18	1.22	1.29	1.82	1.23	1.89
Georgia	1.19	1.62	1.00	1.12	1.13	1.19	1.16	1.43	1.20	1.74
Guam	1.24	1.38	NA	NA	NA	NA	1.24	1.38	NA	NA
Hawaii	1.18	1.31	0.79	0.73	1.07	0.99	1.17	1.26	1.26	1.53
Idaho	1.20	1.45	1.36	1.87	1.17	1.20	1.17	1.33	1.22	1.57
Illinois	1.22	1.53	1.17	1.49	1.19	1.25	1.27	1.59	1.21	1.54
Indiana	1.21	1.67	1.16	1.31	1.23	1.31	1.24	1.54	1.21	1.72
Iowa	1.24	1.48	1.12	1.47	1.23	1.36	1.26	1.61	1.26	1.63
Kansas	1.22	1.45	1.02	1.11	1.21	1.28	1.27	1.55	1.24	1.63
Kentucky	1.20	1.41	1.20	1.55	1.21	1.28	1.23	1.37	1.20	1.43
Louisiana	1.26	1.46	1.12	1.21	1.24	1.26	1.29	1.55	1.26	1.61
Maine	1.13	1.37	0.79	0.73	1.21	1.40	1.25	1.67	1.09	1.26
Maryland	1.16	1.40	0.95	0.88	1.27	1.44	1.19	1.45	1.16	1.41
Massachusetts	1.18	1.53	1.17	1.58	NA	NA	1.26	1.70	1.18	1.53
Michigan	1.14	1.41	1.10	1.42	1.14	1.14	1.18	1.48	1.13	1.42
Minnesota	1.17	1.41	1.02	1.11	1.15	1.17	1.18	1.31	1.18	1.48
Mississippi	1.24	1.49	1.22	1.41	1.26	1.42	1.10	1.21	1.24	1.69
Missouri	1.25	1.62	1.22	1.58	1.26	1.41	1.29	1.61	1.24	1.66
Montana	1.14	1.25	0.94	0.92	1.14	1.18	1.16	1.23	1.13	1.32
Nebraska	1.16	1.25	0.92	0.89	1.19	1.22	1.24	1.50	1.12	1.25
Nevada	1.27	1.71	NA	NA	1.00	0.92	1.22	1.27	1.32	1.89
New Hampshire	1.25	1.68	0.79	0.73	1.27	1.50	1.35	2.05	1.24	1.81
New Jersey	1.20	1.52	0.99	1.19	NA	NA	1.18	1.53	1.20	1.53
New Mexico	1.23	1.58	0.95	0.88	1.17	1.18	1.29	1.68	1.26	1.74
New York[1]	1.06	1.13	0.92	0.88	1.19	1.38	1.11	1.32	1.05	1.11
North Carolina	1.13	1.36	1.02	1.31	1.20	1.27	1.20	1.47	1.11	1.35
North Dakota	1.10	1.12	0.79	0.73	1.16	1.22	1.12	1.13	1.05	1.06
Ohio	1.22	1.53	1.16	1.46	1.20	1.29	1.25	1.55	1.22	1.54
Oklahoma	1.25	1.47	1.16	1.31	1.24	1.34	1.30	1.54	1.26	1.65
Oregon	1.24	1.73	0.95	1.09	1.24	1.28	1.30	1.59	1.25	1.84
Pennsylvania	1.19	1.58	1.00	1.03	1.21	1.36	1.22	1.56	1.19	1.59
Puerto Rico	1.08	1.08	0.79	0.73	NA	NA	1.22	1.33	1.09	1.05
Rhode Island	1.15	1.35	0.79	0.73	NA	NA	NA	NA	1.15	1.36
South Carolina	1.12	1.27	0.91	0.84	1.19	1.19	1.13	1.30	1.12	1.28
South Dakota	1.17	1.25	NA	NA	1.20	1.21	1.28	1.48	1.13	1.28
Tennessee	1.27	1.63	1.16	1.49	1.28	1.44	1.29	1.50	1.27	1.70
Texas[1]	1.22	1.53	1.18	1.56	1.23	1.30	1.29	1.59	1.20	1.56
Utah	1.25	1.67	1.06	1.30	1.15	1.18	1.27	1.59	1.29	1.84
Vermont	1.18	1.41	NA	NA	1.24	1.44	1.11	1.46	1.17	1.39
Virginia	1.17	1.50	1.22	1.86	1.24	1.27	1.25	1.53	1.15	1.51
Washington	1.24	1.71	0.90	0.83	1.14	1.20	1.21	1.54	1.26	1.77
West Virginia	1.23	1.44	1.28	1.59	1.23	1.26	1.20	1.32	1.25	1.55
Wisconsin	1.23	1.71	1.14	1.55	1.25	1.47	1.23	1.65	1.22	1.79
Wyoming	1.19	1.40	0.79	0.73	1.21	1.25	1.20	1.41	1.20	1.57

[1] New York and Texas nursing/therapy case mix numbers here are likely to be lower than in actuality, due to billing practices in some SNFs which impede classification using the Medicare provider analysis and review file analog.

NOTE: NA is not available.

SOURCE: Urban Institute 1992 Medical provider analysis and review skilled nursing facility data base.

While the MEDPAR proxy for the RUG-III classification system is very useful, however, it does have limitations. Although the NHCMQ demonstration clinical therapist workgroup[10] generally agreed with the grouping decisions, the MEDPAR proxy data and the MDS+ data for the same resident may not be exactly analogous. Research continues on the comparability of the classifications of residents in the two data bases.

Some unavoidable constraints in the construction of the MEDPAR proxy are evident. First, the proxy represents only Part A therapy services, and since many residents drop out of the MEDPAR file after 20 days (or in any case, after 100 days, when Medicare coverage ends), the proxy does not give a full picture of the therapy services SNF residents receive. Nor does the proxy include all the categories of the RUG-III system, as previously explained. In addition, it cannot reproduce nursing rehabilitation patterns, the ADL index, service counts, the Impaired Cognition items, or some of the other criteria used in the RUG-III classification. Therefore, the proxy represents the RUG-III in a general way, at the highest level of aggregation.

Accepting these constraints, preliminary analyses of comparability looked for matches between the two data bases within particular variables.[11] For example, do the two data bases report the same admission and discharge dates for SNF stays? In actuality, there is about a 1-month discrepancy in these dates between the two data sets. Do the diagnoses match? If MDS+ reports a stroke, does MEDPAR report a stroke for the same resident? Is a resident classified in the same category using the MEDPAR analog as she would be using the RUG-III system?

The Urban Institute is working in conjunction with Allied Technology Group, Inc. to link the MDS+ and MEDPAR files using patient identification numbers. At this time, no data concerning the success of the matching is available. The Medicare portion of the NHCMQ demonstration becomes operational in early 1995, however, which will create a data set that matches the MDS+ with MEDPAR by definition. This will offer the opportunity for detailed analysis of the comparability of the MEDPAR and RUG-III classifications.

Preliminary tests for resident-level matches between MEDPAR and MDS+ revealed some structural differences in the nature of the data and the data collection. MEDPAR represents claims collapsed to the stay level, and data is reported at the end of the stay. MDS+ data is presently gathered on the 7th day of the resident's stay (at the latest, although amendments can be made up to the 14th day). The next MDS+ assessment is on the 90th day, when Medicare coverage has ended and residents have dropped out of the MEDPAR file. Often, a resident's classification will change over the duration of his or her stay. Thus, a resident may appear as Clinically Complex in MDS+ (in the early part of her stay), as Rehabilitation in MEDPAR (at the end of her Medicare stay, but not necessarily of her total stay), and as Reduced Physical Function in MDS+ at her second assessment. In the future, MDS+ data will be gathered on a more frequent basis, which will improve their comparability to MEDPAR. Greater similarity between the two files will offer more information about the course of an illness and its treatment over the full duration of the episode.

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[10] The workgroup consisted of approximately 20 occupational therapists, physical therapists, and speech pathologists. Members of the group were nominated by their respective professional associations and selected by the technical design contractor with the approval of the HCFA project officer.

[11] We considered making a simple comparison of the MEDPAR-generated distribution of 1992 SNF residents with a RUG-III distribution for the same States and year. Since MEDPAR only includes Medicare patients, and MDS+ assessments include all residents of nursing homes (reflecting longer term stays, and possibly lower case mix), it was decided that this comparison would not yield very useful information.

In addition, residents in a sizeable subset of facilities are not adequately classified using the MEDPAR analog. SNFs across States bill ancillary services differently. In the early runs using the Rehabilitation proxies, over 20 percent of the stays fell into the lowest Rehabilitation category. David Wilcox, in his study of New York data, found that well over one-third of New York facilities do not break out ancillaries on the SNF claim. They charge an all-inclusive per diem rate which brings the entire therapy amount under the "routine limit." As a result, nursing/therapy case mix for New York is skewed away from the higher Rehabilitation categories; that is, the case-mix number will be lower than it really is because high-cost therapy patients are effectively omitted from case-mix calculations using MEDPAR.

Similarly, an examination of Texas data showed that about one-third of facilities there bill some ancillary services, such as medications and medical supplies, separately, but they do not include therapy charges on the SNF claim. In such cases, therapy services are provided by independent rehabilitation agencies, which usually bill Medicare separately under Part B. As a result, beneficiaries' Part A SNF claims do not report some therapy charges, although therapy may well have been provided in the SNF during the stay.

In some cases, then, MEDPAR offers less information than MDS+ data. In other cases, the reverse is true. For example, the multi-State NHCMQ demonstration did not gather data on swing-bed hospitals. By definition, swing-beds only appear in rural areas. Several of the demonstration States are largely rural and have high proportions of swing-bed facilities (Table 8). This population, missing from the MDS+ data base, is included in the MEDPAR set.

Since the non-rehabilitation categories of the proxy were delineated in a fairly informal fashion by a single investigator, questions may arise regarding the reliability of the pairing of the ICD-9-CM codes with the RUG-III clinical criteria. The comparability of the proxy to RUG-III has not been validated. Potentially, a medical records administrator could examine the crosswalk and offer suggestions. The fact that the same single investigator handled all the matches, however, offers a consistency that committee-style selection would not. In addition, that individual is intimately acquainted with the intent of the RSM items on which the RUG-III system is based, because she helped develop them.

It should be noted, however, that the usefulness of the MEDPAR proxy does not depend on its ability to duplicate verbatim the MDS+ classifications. The intent of the proxy was to apply Medicare data to the RUG-III classification system in order to typify residents, examine gross patterns, and develop case-mix payments. In addition, one would expect the proxy to be more and more accurate (in terms of comparability to RUG-III) as one moves from the level of the individual to the facility, the State, and then the national level. Finally, the proxy is in development stages and will likely improve with time and suggestions.

Table 8

Proportion of Swing Beds in NHCMQ Demonstration States

State	1989	1990	1991	1992
			Percent	
Kansas	54.22	53.80	49.73	44.79
Maine	8.33	11.54	9.38	10.00
Mississippi	62.11	63.16	60.61	55.77
South Dakota	74.07	71.19	55.56	53.25
Nebraska	62.39	57.89	52.42	48.89
Texas	17.79	17.13	15.86	13.57
New York	0.00	0.00	1.29	1.44

NOTE: NHCMQ is the Nursing Home Case Mix Quality demonstration

SOURCE: Urban Institute Medicare provider analysis and review skilled nursing facility data base, 1987-92.

CONCLUSION

Using average charge-ranges and diagnosis and procedure codes, the RUG-III resident classification system for SNFs was simulated for a national sample using Medicare SNF claims data from the MEDPAR data base. This article describes the RUG-III classification system and explains the methods used to create the MEDPAR proxy. The analog can be used to characterize SNF residents across the Nation and to examine the cost and quality of the care they receive. It can also be used to calculate case mix over time nationally, by State, and by type of facility.

The MEDPAR analog can be used to address specific policy questions currently under debate. For example, do types of patients and service patterns vary across the country, and if so, how? This question is central to the discussion of differential payments across regions, facilities, and types of patients. As another example, since changes in case mix can be tracked over a period of years, the analog facilitates statements about whether patients are getting sicker over time. The increase in nursing case mix supports a more severe case load in 1992 than in 1987. Differential changes between nursing case mix and nursing/therapy case mix over time may suggest that changes in treatment patterns (i.e., therapy) also drive increases in case mix. These changes in treatment patterns translate into increased costs to Medicare for ancillary services, which are of obvious concern in times of fiscal conservatism.

Limitations in MEDPAR data make it impossible to exactly reproduce the RUG-III categories, however, and so it must be kept in mind that the analog provides a general overview and not minute detail. As the analog comes into increasingly wider use, it is important that researchers and officials understand precisely what the proxy and proxy case mix represent, so that they are not misused or misinterpreted.

In addition to its usefulness for HCFA, the MEDPAR proxy to the RUG-III classification system opens new research doors in post-acute care. Immediate uses include improving the case-mix weighting system and learning more about the Medicare SNF population. For example, research is being conducted by the Urban Institute and Allied Technology Group, Inc. to link the MDS+ file to the MEDPAR file to track residents between Medicare-covered stays. From this, the full course of an illness can be better understood, and common patterns across diagnoses may be identified.

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APPENDIX B

MULTIVARIATE METHODS

AND

DETAILED FINDINGS

Appendix B

Multivariate Methods and Detailed Findings

1. Transitions

To examine the correlates of transitions across facility categories we use the multinomial logit model. The multinomial logit model is appropriate for analyzing determinants of a set of distinct alternatives. Here, we employ the model to describe the transitions to alternative facility categories as a function of the relevant state policies and facility characteristics.

The probability of a particular outcome in the follow-up period is assumed to be a function of key market and facility characteristics:

$$Pr(FacilityType_i) = \frac{\exp(x'\beta_i)}{1+\exp(x'\beta_1)+\exp(x'\beta_2)}, \qquad i=1,2$$

The subscripts refer to the number of different transitions in the follow-up period. When only one transition is possible, as for the subsequent analysis of Medicare SNFs, the model reduces to a simple logit estimation. The vector x describes market and facility characteristics and β_1 and β_2 are the associated parameters that describe the effect of x on the probability of a given transition. Each parameter describes the effect of x on the relative probability of a transition as compared to staying in the facility category from the baseline period.

Consider the model of the transition from ICF in 1987 to SNF/Medicaid or SNF/Medicare in 1989 which yields two sets of parameter estimates. The first set of parameters is associated with the relative likelihood of a facility becoming SNF/Medicaid rather than staying an ICF. A positive coefficient implies a higher probability of switching to a non-Medicare SNF. A second set of parameters is associated with the relative likelihood of a facility becoming a Medicare SNF rather than staying an ICF. A positive coefficient implies a higher probability of switching to a Medicare SNF.

Each parameter can be interpreted in terms of its effect on the log of the ratio of probabilities. This is convenient for interpretation, since the logged ratio of probabilities is a linear function of the x's. For example, in the model of the transitions among ICFs, the log of the ratio of the probabilities of a facility switching to non-Medicare SNF and maintaining ICF status can be written as:

$$\log\frac{Pr(SNF\ Medicaid)}{Pr(ICF)} = x'\beta_1,$$

The log of the ratio of the probabilities of a facility becoming a Medicare SNF and maintaining a ICF status is:

$$\log\frac{Pr(SNF\ Medicare)}{Pr(ICF)}=x'\beta_2$$

A positive coefficient β_1 is associated with a higher probability of a transition to SNF/Medicaid, while a positive coefficient β_2 is associated with a higher probability of a transition to SNF/Medicare. Finally, a larger difference between the coefficients β_1 and β_2 implies a higher relative probability of the facility becoming a non-Medicare SNF rather than becoming a Medicare SNF.

Findings from the analysis of transitions are presented in Tables B.1 and B.2.

2. Changes in Medicare Beds

We focus on the direction of change rather than the level of change for two reasons. First, the direction of change is a direct indicator of behavior, unaffected by questions of scale. Second, the statistical model to describe the change in the number of beds is more complicated than the model used here and provides little additional information. The complexity results from the large share of facilities that maintain a fixed number of beds. A simpler regression model is thus inappropriate; proper modeling requires a model (such as a switching regression model) that takes into account the large number of facilities with no change in beds, together with a wide range of positive and negative changes.

We use an ordered probit to model the change in Medicare bed supply. The outcome takes on three ordered values: (1) for Medicare bed decreases; (2) for constant Medicare beds, or (3) for Medicare bed increases. Each change is measured between the baseline period (1987 or 1989) and the follow-up period (1989 or 1991).

The ordered probit model assumes that whether a facility decreases, maintains, or increases its Medicare bed supply is determined by a latent or unobserved variable, the "propensity to increase Medicare bed supply."[7] This latent variable is a function of the characteristics of the market and the facility. Within this framework, we can analyze whether market and facility characteristics are associated with higher likelihoods of increasing Medicare bed supply.

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[7] The key feature of the ordered probit model is that there is a single process that determines whether a facility decreases, maintains, or increases its Medicare bed supply. This can be viewed as a restriction on a non-ordered multinomial model in which two distinct processes determine the relative probabilities that a facility decreases, maintains, or increases its Medicare bed supply.

Table B.1: Medicaid/Non-Medicare SNF to Medicare SNF Relative to Remaining A Non-Medicare SNF Between 1987 and 1989

EXPLANATORY VARIABLES	1987 Sample Size: 1014	1989 Sample Size: 886
Facility Characteristics		
Proprietary	1.2***	1.7***
Non-Proprietary	-0.1	0.6
Free Standing	1.1*	-0.05
Both ICF and SNF Beds	0.03	-1.2***
Total Beds	0.003**	0.003*
State Policies		
Medicaid SNF Reimbursement	-0.08***	0.02**
Medicaid ICF Reimbursement	0.1***	-0.004
Medicaid Casemix Adjustment	0.8***	-0.04
Medicaid Retrospective Reimbursement	1.2***	2.07***
Certificate of Need or Moratorium	-0.5**	-0.1
Area Characteristics		
Urban Location	-0.5**	-0.04
Swing Beds per Elderly	3.2	-31.5
Medicare SNF Bed per Elderly	1.5	-0.3
No Medicare SNF Beds in Baseline Year	0.3	0.001
Hospital Discharges per Medicare Bed	0.0003	-0.0000

NOTE: Facilities moving to ICF status were excluded.

*	Significant at 0.1
**	Significant at 0.05
***	Significant at 0.01

Table B.2: Movements From ICF Only to Non-Medicare or Medicare SNF Relative to Remaining an ICF Between 1987 and 1989, and between 1989 and 1991

EXPLANATORY VARIABLES	MOVEMENTS FROM ICF TO NON-MEDICARE SNF		MOVEMENTS FROM ICF TO MEDICARE SNF	
	1987 Sample size: 3077	**1989** Sample size: 2904	**1987** Sample size: 3077	**1989** Sample size: 2904
Facility characteristics				
Proprietary	1.08	0.03	1.0*	0.3
Non-Proprietary	0.8	-0.2	0.2	00.5
Free Standing	-1.2	0.5	-1.01	-0.6
Total Beds	0.006***	-0.0007	0.01***	0.003*
State Policies				
Medicaid SNF Reimbursement Rate	-0.02*	-0.00008	-0.01*	-0.02***
Medicaid ICF Reimbursement Rate	0.01	0.02***	0.02**	0.04***
Medicaid Casemix Adjustment	0.003	0.3*	0.3	-0.4*
Medicaid Retrospective Reimbursement	0.1	-0.8***	-0.4	-1.2***
Medicare Maximization	-0.2	-1.0	0.4*	0.5**
Certificate of Need or Moratorium	0.2	0.2	0.3	1.1***
Area Characteristics				
Urban Location	0.09	-0.1	0.4*	-0.02
Swing Beds per Elderly	20.6	-3.5	-6.4	-9.8
Medicare SNF Beds per Elderly	-1.2	0.3	1.6	1.7
No Medicare SNF Beds in Baseline Year	-0.5	-0.4*	-0.05	-0.3
Hospital Discharges per Medicare Bed	0.0009	-0.002	0.0003	-0.003

*	Significant at 0.1
**	Significant at 0.05
***	Significant at 0.01

The statistical model is written in terms of the propensity to increase Medicare beds, b^*:

$$b^* = x'\beta + \epsilon$$

where x is a vector of market and facility characteristics and β is the vector of associated parameters to be estimated. The disturbance, ϵ, is assumed to be drawn from the normal distribution and to be uncorrelated with x.

The observed outcome, whether a facility decreases, maintains, or increases the number of beds is related to b^* as follows:

Outcome	Condition
Decrease Medicare beds	if $b^* < 0$;
Maintain Medicare beds	if $\mu > b^* > 0$; and
Increase Medicare beds	if $b^* > \mu$.

The parameter μ adjusts to ensure that the predicted distribution of outcomes reflects the sample proportions.

Having defined these relationships, we can calculate the probability that a facility decreases, maintains, or increases its Medicare bed supply. These probabilities are:

$$Pr(increase\ \ beds) = Pr(b^* > \mu) = Pr(\epsilon > \mu - x'\beta)$$

$$Pr(nochange) = Pr(\mu < b^* < 0) = Pr(-x'\beta < \epsilon < \mu - x'\beta)$$

$$Pr(decreasebeds) = Pr(b^* < 0) = Pr(\epsilon < -x'\beta)$$

Maximum likelihood techniques are used to estimate the model parameters.[8]

Once estimated, the model parameters provide a measure of the effect on the Medicare bed supply of variation in the variables included in the model. Most simply, a positive coefficient on the variable x means that an increase in x is associated with a greater chance of a more positive change in Medicare bed supply. For example, consider a negative coefficient associated with having a moratorium on nursing home construction. This implies that in areas with a moratorium there is a smaller probability that Medicare bed supply will increase rather than stay constant, and a smaller probability that the Medicare bed supply will stay constant rather than decrease.

Findings from the analysis of changes in Medicare beds are presented in Table B.3.

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[8] Our estimation is performed using the LIMDEP 6.0 statistical package.

Table B.3: Ordered Probit of Changes in Medicare Beds Between 1987 and 1989 and Between 1989 and 1991

EXPLANATORY VARIABLES	**1987** Sample Size: 3838	**1989** Sample Size: 4195
Facility Characteristics		
Proprietary	-0.09	-0.2**
Non-Proprietary	-0.04	-0.06
Free Standing	-0.05	-0.08
Both ICF and SNF Beds	0.2***	0.3***
Commercial Insurer	0.2***	-0.1***
Total Beds	0.0005*	-0.0002
State Policies		
Medicaid SNF Reimbursement Rate	-0.003	0.01***
Medicaid Casemix Adjustment	0.3***	-0.2***
Medicaid Retrospective Reimbursement	0.4***	-0.2***
Medicare Maximization	0.04	0.1**
Certificate of Need or Moratorium	0.1**	0.06
Area Characteristics		
Urban Location	-0.02	-0.006
Swing Beds per Elderly	23.5**	-0.5
Medicare SNF Beds Per Elderly	-1.04***	0.02
Hospital Discharges per Medicare Beds	0.003***	-0.001*

*	Significant at 0.1
**	Significant at 0.05
***	Significant at 0.01

3. Utilization and Casemix

The multi variate analysis of utilization is conducted using a log-linear regression model. The outcome (changes in the log of days, stays, or length of stay) is assumed to be a linear function of a set of facility and market characteristics (x) and a disturbance, ϵ:

$$y=x'\beta+\epsilon$$

The parameter β is to be estimated. The disturbance ϵ is assumed to be uncorrelated with x. The interpretation of the model is relatively straightforward. The coefficient on a variable x approximates the percent change in the outcome (i.e., percent change in number of days, stays, or length of stay) associated with a change in x.

The log-linear form of the model implies a convenient transitive relationship between the coefficients from the days, stays and length of stay model. For each independent variable, the associated coefficient in the model of number of days is the sum of the coefficients from the models of number of stays and length of stay:

$$\beta_{Days\ per\ Bed}=\beta_{Stays\ per\ bed}+\beta_{Length\ of\ Stay}$$

Thus, the total percentage impact of an independent variable on the number of days can be partitioned into the effect through number of stays and the effect through length of stay. Findings from the analysis of utilization are presented in Table B.4.

The analysis of casemix is conducted using a linear regression model framework. The outcome is a direct measure of the change in the outcome over time. The coefficient on a variable *x* provides a measure of change in casemix over time that varies with a change in *x*. Findings from the analysis of casemix are presented in Table B.5.

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